Towards a social archaeology of the mesolithic in eastern Scotland:

landscapes, contexts and experience

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Volume I: Main Text

Towards a social archaeology of the mesolithic in Eastern Scotland: landscapes, contexts and experience

The research reported here arose from perceived *lacunae* regarding archaeological understanding of mesolithic settlement in eastern Scotland. Historically this area, for a number of reasons, has seen little archaeological research in comparison to the maritime west of the country, a bias that requires redressing. The characteristics, problems and potentials of available data are assembled for the first time and critically assessed. Discussion of methodologies appropriate to this material is developed, and small-scale fieldwork undertaken within this framework presented. Any introduction of a new range of data is, in part, a construction of that data, and the particular interpretative and thematic stresses of the thesis arise from the argument that narratives of gatherer-hunter communities in the past have objectified those groups, consequently hindering comprehension of them. To this end an approach to a social archaeology of the mesolithic is developed, stressing the importance of examining skills and routines that, through their extension in particular contexts, may have structured an agent's experience of landscapes in the past. In order to flesh out these arguments and introduce the material evidence in more detail, a series of overlapping case studies is developed exploring in turn, the relationships between mesolithic folk and woodlands, the significance of salmon fishing, the inhabitation of the coast, and stone tool procurement, production and discard. These varied narratives incorporate the results of a range of small-scale desktop projects and fieldwork designed to test the potential of this approach to a social archaeology of the period. Whilst these studies are at present fragmentary, it is contended that they demonstrate that accounts of gatherer-hunter communities in the east of Scotland can aspire to a meaningful level of engagement with human lives in the past. The project scholarship was funded by Historic Scotland.

Note

All of the lithics catalogued during this research are detailed in databases constructed in Access 97. These databases are presented on CD-Rom, located in the inside back cover of Volume II. A further electronic format of the entire thesis including the databases is stored in the NMRS, Edinburgh.

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I would like to thank my supervisors, Bill Finlayson and Ian Ralston, for support and advice throughout the three years I have been working on thesis. It may not be quite the text they anticipated, but I hope they like it. I would also like to thank a number of people who have read and commented on varied chapters at different times: Amber Godwin has proof read large amounts of the text; Mel Giles and Danny Hind both made valuable comments on Chapter 1; Richard Tipping gave much needed advice and support on Chapter 4. The thesis has benefited greatly from a critical reading of Part 1 by Neil Curtis for which I am very grateful.

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In October 1995 Mark Edmonds set me an essay question for the Masters in Landscape Archaeology I was doing at Sheffield. The question was something like, 'how might a landscape perspective contribute to an archaeology of social reproduction in the mesolithic'? It's a pretty good question – although I don't think my answer at the time was much use. I realised recently that I've spent nearly six years trying to answer it, which is pretty slow even given Mark's flexibility with deadlines. And I've still not finished with the problems it raises – not even close. This thesis is a contribution to the larger project of trying to answer that essay question. Maybe in another 6 years I'll be able to answer it in 2,500 words, rather than 100,000. I am very grateful to Mark and many other folk from Sheffield for such an inspirational introduction to what archaeology can achieve and why it's so much fun.

I would like to thank my parents for their continued support. I would also like to thank Amber for everything.

Of course, the final responsibility for all arguments contained within is my own.

Finally, I dedicate this thesis to the memory of my friend Ken Browell; who tragically took his own life in August 2000.

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ILLUSTRATIONS

'We have failed to adequately distinguish between the way we as archaeologists classify the data and how people in the past actively used material culture to create their lives and worlds'
(Cooney 2000: 3)

'The subjectivities that should concern us as historians arose as those tasks were executed by people whose own knowledge of how to proceed was reworked by their ability to read each situation'
(Barrett 1999: 24)

'We need prehistory based around ideas not just data ... we have to be over-ambitious, not under-achievers'
Richard Bradley, IFA Conference, Glasgow 1999

Introduction: contexts and constructions

> '...there is no knowledge of the Other which is not also a temporal, historical, a political act' (Fabian 1983: 1)

From the beginnings of the Holocene until approximately 4000 cal BC many generations of people in what we now call eastern Scotland mainly relied upon gathering, fishing and hunting to feed themselves. Today, we argue that these people belong to the mesolithic[1] era of our history, and attempt to understand their lives through archaeological methods. This thesis provides an interpretative engagement with those lives. In this introductory chapter I outline the aims and rationale for the particular character of the study undertaken.

[1] Throughout this thesis I will discuss the mesolithic rather than the Mesolithic.

Contexts and constructions

> 'The way we see things is affected by what we know or believe... we only see what we look at' (Berger 1972: 8)

This thesis is a result of a scholarship offered by Historic Scotland in response to a proposal by Dr Bill Finlayson, then Manager of the Centre for Field Archaeology, University of Edinburgh. Historic Scotland funded a three-year PhD research programme into the mesolithic of eastern Scotland because of an acute need to establish regional frameworks for the east.

Systematic research on the mesolithic in Scotland has focused very heavily on the west. In recent years this has included work by Affleck (1986; Affleck *et al.* 1988), Mercer (1968, 1970, 1971, 1972, 1974, 1980; Mercer & Searight 1986), Mellars (1978, 1987), Wickham-Jones (1990, and ongoing research), McCullagh (1991), Mithen (1990; Mithen & Finlayson 1991; Mithen *et al.* 1992; Mithen & Lake 1996; Mithen ed. forthcoming), Bonsall (Bonsall 1996; Bonsall *et al.* 1991, 1992, 1994; Russell *et al.* 1995), and in the southwest by Coles and Cormack (J Coles 1964; Cormack 1970; Cormack & Coles 1968). Only Tom Affleck worked to any extent in the interior of Scotland, and this was brought to an unfortunate end by his untimely death (see Edwards 1996a). In the east of Scotland, with the exception of Morton (J Coles 1971, 1983), mesolithic research has been limited in nature (*e.g.* Kenney 1993), or, as in the case of research by Kenworthy, remains largely unpublished (Kenworthy 1981). Work by authors such as Mulholland on the Tweed and Hawke-Smith on the Ythan has done little more than add to a catalogue of surface collections (Mulholland 1970; Hawke-Smith 1980). There have been a few exceptions where rescue work has uncovered mesolithic remains (*e.g.* Kenworthy 1982; Wordsworth 1985; Wickham-Jones & Dalland 1998), but notwithstanding the high quality of excavation, these are not the result of targeted mesolithic research programmes, and offer little more than glimpses of what may survive.

At the outset of this research little recent synthetic study had therefore been made of the character or extent of gatherer-hunter settlement in eastern Scotland. Regardless of the value of the varied work undertaken in the west, it was unclear that these interpretations were appropriate to gatherer-hunter lives in the varied environments of the east. The first aim of this thesis is therefore straightforward

- *to introduce the evidence from eastern Scotland and to begin to suggest frameworks for coming to terms with this data*

If the first aim is obvious, the second may initially seem rather misplaced, although it is inseparable. For within a text aiming to introduce a relatively unknown and problematic body of material I also aim

- *to contribute to the generation of a social archaeology of the mesolithic period*

The arguments underlying this commitment are important. Too often, perhaps, archaeologists have tended to treat interpretations of archaeological material as if they were but a gloss upon raw data that can be recorded and discussed rigorously and objectively. To those of this belief a thesis of this type should concern itself solely with the discussion of archaeological absolutes: typology, quantities of sites – the mesolithic as a modern day phenomenon defined solely in terms of archaeological parameters. Unfortunately this argument is misplaced, being reliant upon a radical separation of analytical procedure and the subjects of our knowledge that cannot be sustained (see below). It also fails to recognise that our narratives, at whatever level, are interpretations and constructions of human lives, consequently carrying an ethical and moral responsibility as well as a scientific one. This implies that we must pay serious critical attention to the ways in which our statements define past human lives.

The implausibility of separating analytical procedure and the subjects of archaeological knowledge can be demonstrated by the concept of archaeological reality. By this I refer to the close interplay between sets of ideas and material practices that shape the way we engage with the past in the present. Understandings of gatherer-hunters in the past, for example, are based upon situated interpretations of material culture existing in the present (Barrett 1999: 21). They are therefore contingent and fundamentally dependent on the establishment of a particular archaeological reality in the present. Despite the vogue for textual analyses of discourse (*e.g.* Tilley 1990), archaeology is no more reducible to ideas and texts than it is reducible to the archaeological record, and an archaeological reality refers not only to the ways in which we discover material – through excavation, collection or desktop survey – but also to the ways in which we describe, delineate and define the material remains of the past; transforming, for example, a piece of flint into a 'scalene triangle' or a group of peoples into 'the mesolithic'. It is only once a present day materiality forms part of an archaeological reality that it contributes to our knowledge of the past (see also Chippindale 2000). For example, uncatalogued lithics are not necessarily an *archaeological* reality, they are merely a material reality, with the potential to contribute to our knowledge about the past. Until they have been analysed, published, and made available to an archaeological audience, they cannot be considered archaeologically useful.[2] Without some interpretation, at whatever level, the objects do not form a part of the reality within which we attempt to come to terms with the Postglacial human settlement of Scotland.

The process of establishing an archaeological reality has important implications:

> 'Categories of data (types of find, site or artefact assemblage), catalogues, plans and written descriptions – all these comprise the conventional language of an archaeology which is concerned with the collation, comparison and synthesis of large bodies of information. Such linguistic conventions objectify (make real) an archaeological record as a material phenomenon belonging to our own world ... the archaeological frame of reference establishes a security regarding our ability to describe the present. Archaeologists may aim to study the past, but their first step is to describe material residues as they appear to exist in our present day world. Most archaeologists have difficulty in recognising this static 'record' as the result of their own prejudiced encounter with the material evidence. ...the creation of such a record has important implications for the way in which any history can be written with reference to it.' (Barrett 1994: 32)

Given that archaeological practice creates certain types and forms of knowledge through processes of objectification in the present a fundamental concern with analytical procedure must be the differences that exist between our archaeological reality and those realities that may have existed in the past (Barrett 1997: 59-60). I believe that many accounts of gatherer-hunters in prehistory have objectified ('made real') these societies in unacceptable fashions, embedding them within their environments and not taking seriously the potential of prehistoric material culture to inform us of the conditions within which knowledge became possible in the past. Particular analytical stresses have created a distinct type of archaeological reality that has significant implications for our representations of prehistoric lives.

For example, our category of gatherer-hunters reflects one particular way of categorising and comparing people. Before *c.* AD 1740 there was no notion of gatherer-hunters past or present (Barnard 1999: 375) and the idea of 'hunter-gatherers' as a distinct group of peoples only arose from the writing of Montesquieu and the Scottish Primitivists, who were

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[2] See Robbins (1999: 43) for discussion of rescue archaeology's 'silent relocation' of material from field to file.

concerned with defining the relationship of property to the individual (ibid.; also Piggott 1976: 151ff). Gatherer-hunters, amongst other 'savages', were seen to be living in a state of nature (see below) and therefore assisted in the self-definition of 'civilised man', by, for example, representing the 'natural' basis of universal property rights (also Kuper 1988).[3] In fact, similarities between 'gatherer-hunters' of northern Australia and 'horticulturalists' of Papua New Guinea demonstrate that such labels can obscure many similarities between 'small scale low intensity economic systems' (Lourandos 1997: 74ff). Rather than representing a natural, timeless way of categorising peoples our contemporary focus on the mode of production arose in a particular capitalist and colonial context. As Wylie notes (1985), the belief that gatherer-hunters make good analogies for gatherer-hunters is based on neo-evolutionary logic. The use of the economy as a baseline for comparison is therefore an important aspect of the process of objectification of a 'gatherer-hunter' community.

As well as objectifying groups as economic types many archaeological accounts have treated archaeological materials as indicators of socio-cultural affiliation. Within such frameworks the interpretation of material culture in the present bears little or no relationship to the subjective experience of agents in the past but makes reference to a point of absent origin for their behaviour. People who manufactured microliths, for example, are transformed into absent signifiers of supposed historical processes: objectified as part of a tradition and firmly located in time and space as the mesolithic occupants of an area. As subjects they are ignored, whilst their collective background is classified as an object of study for the objective construction of the prehistory of Europe.

As well as these processes of objectification the study of prehistoric gatherer-hunters has always been closely associated with the study of the environments in which they lived: the mesolithic has, for example, been defined as an adaptation to post-glacial woodlands (Spikins 1999 for discussion). In part this stress on the environment is because of the need to reconstruct those environments, but it also reflects widely held beliefs that the character of the environment will have an important bearing on society. This is an idea with a long and complex history. For westerners in the early modern period, for example, the landscape was understood to be central to the moral and physical nature of its inhabitants: 'for enlightenment figures ... the shape of the landscape was a visible confirmation of the state of

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[3] Echoes of these conceptions can be seen in the use of gatherer-hunter communities as ideals of the Green movement.

human society. Both underwent an evolutionary development from savagery to civilisation' (Cronon 1983: 5-6; see also Glacken 1967; Thomas 1983). During the period of colonial contact western observers often made little clear distinction between the character of the environment in which the other was encountered and the character of the other themselves (Strang 1997). Those seen to be living in a state of nature were opposed to westerners who dominated and manipulated nature. *'Vita activa'*, an activist, interventionist stance to the world celebrated in western thought since the Renaissance (Berman 1983: 92), was central to the physical transformation of the west and to the self-definition of westerners. Those without *vita activa* – natural men – appeared to be without history (Wolf 1982) and passive in the face of the dominant west. The failure of western colonialists to recognise indigenous systems of land management or ownership (Cronon 1983; Smaby 1975) was an important aspect of this process and revealing of situated expectations of how agency might be manifested. Thus a conception of the embeddedness of people within the environment facilitated their domination by denying their agency whilst also maintaining the identity of a metropolitan elite.

Archaeology's origins in the colonial period have arguably contributed in no small way to the epistemological structure of our construction of other people's lives in our metropolitan present (Gosden 1999; Orme 1981; see Fabian 1983; Asad ed. 1973). For example, notwithstanding its recent return to fashion, archaeological concerns with landscape can be traced from the origin of our discipline: links between antiquarians, landscapes and landscape gardening are very strong for example (Piggott 1976, 1985; Bending 1999; Haycock 1999; Peltz & Myrone 1999). These concerns with the significance of the environment are maintained in present day archaeological practice through a variety of media as well as explicit analyses stressing adaptational or behaviourist frameworks (*e.g.* Bailey 1983: 1; Rowley-Conwy *et al.* 1987: 1). For example, opening archaeological accounts with a generalised topographical account rather than letting the characteristics of the archaeology highlight the aspects of the environment that are significant arguably presents the environment as dominant, marginalising human experiences *of* that environment.

Finally, for historical reasons rather than problems with the evidence, the archaeology of the mesolithic period has been dominated by approaches which objectify people by stressing, for example, the reconstruction of the 'system' (*e.g.* Smith 1992), making a positivistic assumption of the stable existence of units such as a band (Myers 1986: 72). Post-processual critiques of archaeological practice demonstrated that material culture is not a reflection of cultural or historical affiliation, but a meaningful construct, constituted in particular historical circumstances, and active in the creation of these contexts (*e.g.* Hodder ed. 1987; Moore 1987). As such, the material world, both constructed and found, contributed to the development of possibilities for agency and knowledge in the past and archaeological interpretations should therefore include the interrogation and analysis of these conditions. The archaeology of the mesolithic period has been slow to take these concerns on board, remaining caught up in a thirty year flirtation with biologically derived models and the 'exquisitely inappropriate form of positivism' (Miller 1987: 143) associated with New Archaeology.

These themes of objectification, environmental dominance and downplaying the potentials for understanding subjectivity indicate some of the ways in which the creation of an archaeological reality for the mesolithic has dehumanised that period, which therefore seems 'less a period of history, an aspect of heritage ... much more like an academic specialism' (Finlayson & Warren 2000: 134). The study of the period often appears as a rather specialised, isolated practice, with little to contribute to wider narratives: the Director of the Council for British Archaeology comments that 'the Mesolithic has no established presence in the public mind' (Morris 1999: 15). Commentators still frequently highlight the differentiation between approaches to the mesolithic period and those to later prehistory (*e.g.* Bradley 1998: 21ff.). These problems were thrown into sharp relief at the IFA conference in 1999, where reviews of all periods of prehistory were offered. In reviewing mesolithic research Mithen argued that by combining 'human ecology, perception of landscape, routinisation of landuse, social interaction and ideology' its practitioners had identified a comfortable 'Third Way' between excesses of rival theoretical movements. However Bradley, discussing the neolithic period, believed that mesolithic archaeology was 'completely hopeless' in regard to social theory. Regardless of who may be right or wrong this disagreement is revealing that the aims and goals of the archaeology of the two periods are still utterly mismatched.

Of course, mesolithic archaeology is not unique in being required to objectify past individuals and communities in order to study them. Any archaeological reality objectifies past societies, and an archaeological perspective is not invalidated by its inability to avoid objectifying observations. But an acknowledgement of the constructed character of our statements and the separation between these statements and the subjective experiences of the lives we describe is vital. As Bourdieu argues

> 'so long as he remains unaware of the limits inherent in his point of view on the object the anthropologist is condemned to adopt unwittingly for his own use the representation of action which is forced on agents or groups when they lack practical mastery of a highly valued competence and have to provide themselves with an explicit and at least semi-formalised substitute for it in the form of a repertoire of rules, or of what sociologists consider a "rôle", *i.e.* a predetermined set of discourse and actions appropriate to a particular "stage-part".' (Bourdieu 1977: 2)

In the archaeological study of the mesolithic the distinction between the logic of the analyst, and those of human practice appears to be more stark than in the study of other periods of British prehistory. The sharpness of this distinction is unfortunate for two reasons. Firstly representing social life in terms of rules, roles or systems offers no meaningful analysis of activity, which must be understood by reference to the varied strategies of agents if it is to explain the duration of structures over time (Bourdieu 1977; Giddens 1981). Secondly, the objectifying view point of the outsider, concerned with delineation of activity, has come very close at times to the perspectives of imperialism and Orientalism – those of a dominating metropolitan elite ruling a distant territory (Said 1992, 1995; Ashcroft & Ahluwalia 1995). In this sense our archaeological representations can be seen to serve the purpose of controlling and delineating those lives, rather than taking them seriously as alternatives to our own.

As Said argues, one way of resisting the domination and misrepresentation of human lives past or present is by identifying 'alternative way(s) of conceiving history' (Said 1992: 260) in the present. Therefore I cannot separate an introduction of the material from the east from developing a 'social archaeology' that may be able to engage meaningfully and ethically with this material. In place of objectifying people as an aspect of a system, or part of their landscape I believe that it is necessary to look diachronically at society, especially at the processes of social reproduction (Myers 1986; Pred 1990). Human life is temporal, and exorcising the complicating processes of time at the human scale from our accounts means that we cannot understand our subject (Bourdieu 1977; Fabian 1983: 24-5; Shanks & Tilley 1987: 118ff). Social reproduction, the maintenance over time of particular forms of knowledge, is the central social achievement of groups of people (Myers 1986), is pivotal to our understanding of these societies, and is inseparable from the biographies of the individual agents concerned. Myers argues that 'the human life cycle provides the key to the temporal dimension of many small-scale social systems, where the development of social persons is the basic form of social production.' (Myers 1986: 18), and Pred (1984: 280) notes that 'socialisation and social reproduction always become one another'. By focusing on the production of socialised humans over time we may be able to identify an approach to the mesolithic that informs us of the possibilities for being human that existed in the period. As a corollary of this we must beware interpretations that assume that contemporary human understandings of the world, be those from the metropolitan west or any other world view, are necessarily those of prehistory.

Barrett *et al.* offer one statement of issues involved in understanding the reproduction of societies over time,

> 'Social archaeology confronts several historical problems. It considers how people reproduce (1) their material conditions through their actions upon the environment; (2) the social system by maintaining the demands, and meeting the obligations of, social discourse; and (3) their knowledge and understanding of how to proceed in such practices. The emphasis here is on *reproduction* in the sense of the routine maintenance of social practices, rather than upon discovering descriptive terminologies for entire social systems, such as band, tribe, chiefdom, state etc. These routines are daily and traditional practices, and historical analysis should reveal the means by which such practices were maintained or transformed ... Social systems are therefore reproduced by internalising material conditions in a culturally and historically specific manner.' (Barrett *et al.* 1991: 6-7)

Whilst these aims are clearly laudable such themes sometimes appear to be resistant to the scales at which archaeological analyses are constructed, especially given the relative paucity of the material evidence for the mesolithic. I hope to demonstrate in the body of this thesis that although the evidence is limited it is sufficient to enable an account of social reproduction – examining how people came to act in the world, at forms of practice, and the potentials for differentiation between people caught up in these processes. Many recent accounts in anthropology and archaeology have stressed the importance of the landscape in these forms of analysis (Hirsh & O'Hanlon eds. 1995; Ucko & Layton eds. 1999) and in a general sense this is a landscape archaeology of the mesolithic in eastern Scotland. Landscape is a fashionable, nebulous word in archaeology and in Ch. 1 I refine this statement by examining some recent approaches to the archaeology of gatherer-hunter (and other) landscapes, presenting an approach to the archaeology of social reproduction through a commitment to interpretative engagements with the ways in which dialectics of action and location contribute to self-understanding.

This thesis is therefore concerned with establishing a particular type of archaeological reality for the mesolithic of eastern Scotland. I will introduce the character of the evidence for mesolithic settlement in eastern Scotland but I will do this within an explicit interpretative framework concerned with understanding how people came to know the world. Rather than directly address objectified phenomena such as the system or the mesolithic as an archaeological entity, I will focus upon interpreting material culture in terms of social reproduction and human lives. Not only is this arguably a more ethical approach to archaeology but it may also offer a more meaningful engagement with the material itself, which was generated in particular social contexts in the past and should therefore be understood in terms of those contexts.

Definitions

> 'It is evident that there is a certain disadvantage in living in the continent that invented prehistory...one has to put up with the aftermath of crude and often uncouth beginnings.' (Clark 1978: 1)

> '...specific views about the past can persist and influence archaeological interpretation long after the reasoning that led to their formulation has been discredited' (Trigger 1989: 19)

The particular context of the thesis – a scholarship funded in order to contribute to the management of mesolithic sites in eastern Scotland – dictates a focus on the mesolithic as a unit for analysis in the present. The mesolithic is a modern construction (Pluciennik 1998; Zvelebil 1998) and does not relate to the ways in which any group of people in the past understood themselves, and it may mask important variation within the period. This thesis is therefore, unavoidably, structured around a category constructed in the present that has a problematic relationship to realities in the past. My decision to de-capitalise all period names reflects my problems with the traditional use of these categories. I also stress gatherer-hunter, rather than hunter-gatherer due to the potentially misleading emphasis placed on large game hunting by the latter.

Semantic issues notwithstanding some definitions are required of chronology, geography and classification for this study. In Britain generally the mesolithic is conventionally split into two periods: early and later. The early mesolithic is present in post-glacial Scotland, but is hard to study (**2.2.1.2**[4]). By contrast the later mesolithic seems to begin *c.* 8500 BP (7500 cal BC) and is found very frequently throughout Scotland. Real problems exist with characterising mesolithic sites, it is for example possible that the mesolithic is not always microlithic (**2.2.1.4**), but for the purposes of these analyses, the later mesolithic may, very crudely, be defined as characterised by a blade orientated stone industry featuring narrow blade microliths (**2.2.1.3**). Although problematic, such a definition enables the construction of narratives that may otherwise have been paralysed by indecision.

Identifying the 'end' of the mesolithic is also difficult. Pollard and Morrison state (1996: x)

> 'it has become increasingly apparent over the last ten years or so that the traditional divide between the Mesolithic and the Neolithic is not generally applicable to the early prehistory of Scotland.'

[4] Numbers in bold refer to sections of the thesis, those prefixed by App. to the appendices.

This observation may be more applicable to the west of Scotland (which dominated the discussions in their book) than to the east where important changes in material culture, such as the appearance of pottery, monumental architecture and cultivated species, can be observed in the centuries surrounding *c.* 5000 BP (4000 cal BC). Of course, our accounts of these phenomena are coarse-grained and the probable co-existence of gatherer-hunters and farmers refuses resolution to the temporal focus of the archaeological gaze, but in some senses this period is notable and provides a meaningful point at which to terminate this narrative.

The geographical area examined extends from the Borders in the south along the North Sea coast to the south shore of the Moray Firth in the north. This is a varied area with important differences in climate and topography, but in general east-trending rivers and tributaries provide an important axis of communication through the landscape. This is a large area, and smaller foci have been chosen for case studies (Figure 1). In the Borders a large area of the Tweed Valley has been examined, from the middle valley to upstream of Peebles. A combination of trial excavation (six sites), fieldwalking and survey has enabled a number of studies here. In the northeast substantial analyses have been made of material from the Sands of Forvie, Newburgh in order to examine a coastal site. It had been hoped to combine this with contextual analyses of other sites from the area but due to difficulties with gaining access to material this was not possible. A trial survey of an upland area near the Burn of Calletar, Angus, was undertaken in order to clarify methodologies for upland survey and fieldwork. Desk-based analyses were initiated in the Lunan Valley, Angus, but abandoned after initial failures to identify meaningful samples of mesolithic material for analysis (**App. 4**). Further collections have been examined opportunistically and as part of contract work, and a range of synthetic desk-based studies undertaken in order to produce this thesis. The Appendices include full reports from all the fieldwork I have been involved in, as well as a more comprehensive review of data from the Tweed Valley than was appropriate in the body of the thesis. Full databases of the lithic assemblages examined, constructed in Access97, are appended on CD-Rom.

Methods and structure

Because of the subject matter the thesis cannot, and does not, establish a single question to answer but is united around its attempt to understand the characteristics of mesolithic settlement in the east within an explicit interpretative framework. At an early stage of the research I decided not to undertake an exhaustive search of every museum in order to identify every last microlith from the east of Scotland. Such an approach would certainly contribute to the generation of a series of dots on maps, but it was not clear that it would help understand the characteristics or potentials of the data available. Collections of artefacts from the east are scattered between museums and private homes, and any statement about the total number of artefacts in a region would be misleading. In place of a totalising approach I have addressed interconnected themes allowing the articulation of the characteristics of the data-set and the human lives caught up with that material. A range of methods has been used and chapters range from purely synthetic, to those based entirely on original research. It is also important to note that serious difficulties with access to some material have been experienced.

My original research principally involves lithics analysis. The techniques used have been fairly simple, in part because the exercises aimed to assess the potential of the data to allow more detailed work. My approach to lithics has been informed by my desire to study the enskillment of agents in the past (**1.2**); I stress structures and traditions of stone working rather than absolute typological forms (see **8.1** for more extensive discussion). Microlith typology is an incredibly problematic area and the relationship between formal types and cultural, chronological, functional or social matters is obscure. At this stage of work in the east, especially with so few radiocarbon dates, a focus on stoneworking tradition rather than formal types seems more appropriate. Of course, others disagree: one senior academic, on hearing that my focus was not 'micro-typology', suggested that if that was the case, for all the good I was doing archaeology I may as well be driving a bus. I hope that the studies offered demonstrate otherwise.

The thesis is divided into three parts and nine chapters as detailed below.

Part One: Constructions

Chapter 1 examines archaeological approaches to landscape. Contributions by Tilley and Ingold are discussed. These are interesting, but neither offer a sufficiently historicised account of the development of agency. Alternatives are outlined.

Chapter 2 reviews the data available from the east coast and appraises some of the inherent biases. Results from fieldwork at Rink Farm in the Tweed Valley aimed at assessing the geomorphic context of surface scatters are presented. A survey of the Burn of Calletar undertaken in order to outline methodologies for areas with potential problems with bias is also reviewed.

In Chapter 3 I examine the dominant models that structure accounts of mesolithic landscape, criticising these on theoretical and empirical grounds. I offer a generalised model for mesolithic land use stressing variability and the need to consider temporality.

Part Two: Contexts

Part 2 develops a series of case studies examining how particular material constructs were implicated in the creation of types of knowledge and practice. The themes for these case studies were identified at an early stage of research, and some studies have been more successful than others, however, all offer potential for understanding aspects of mesolithic lives.

Chapter 4 examines the wooded landscape. Although mainly concerned with a discussion of the importance of 'woodland management' this also reviews the character of the mesolithic environment in eastern Scotland.

Chapter 5 examines the possible importance of salmon and other anadromous fish. A link between these and mesolithic activity is strongly suggested by the location of many sites. The evidence is reviewed including a detailed discussion of the 'waisted pebbles' found in surface contexts in the Tweed Valley. Unfortunately the evidence is fragmentary, but it seems unlikely that fishing was very intensive.

Chapter 6 discusses the character of settlement on the coast. Coasts assume an axiomatic part of interpretations of mesolithic life, and are often associated with sedentism and complexity. These models are critiqued on theoretical and empirical grounds. Detailed analyses from recent work at the Sands of Forvie, Aberdeenshire highlight important aspects of the characteristics of mesolithic settlement on the coast.

Chapter 7 looks at the evidence for stone tool procurement, production and discard in the east of Scotland. The Tweed Valley is the main case study here, as the range of raw material utilised offers good comparative data. The results of surveys and excavations of chert quarries are presented. Possible raw material trade is also outlined. Analyses demonstrate subtle differences in the patterns of raw material use and knapping traditions between sites. These patterns are difficult to interpret, but subtle conventions and learning processes are probably implicated. Finally I discuss patterns of stone tool discard.

Part Three: Reviews and prospects

Chapter 8 offers a critical review of the thesis including some suggestions for future research.

Part 1: Constructions

'My assumption is that understanding in archaeology is achieved when the significance for past communities of a materiality is made real to us'
(Robbins 1998)

Chapter 1: Landscapes, experience and an archaeology of social reproduction

> 'Landscapes are created by people – through their experience and engagement with the world around them. ... The landscape is never inert, people engage with it, re-work it, appropriate and contest it. It is part of the way in which identities are created and disputed, whether as individual, group or nation-state. Operating at the juncture of history and politics, social relations and cultural perceptions landscape has to be ... 'a concept of high tension'. It also has to be an area of study that blows apart the conventional boundaries between the disciplines' (Bender 1993: 1, 3)

It is claimed that gatherer-hunter archaeology is first and foremost landscape archaeology (Mithen ed. forthcoming). Of course, at one level, this merely reflects the truism that in order to understand mobile communities we must understand how different sites in a landscape relate to each other. Too often, however, discussions have been framed almost solely within a subsistence context. Questions about economics and subsistence are important, but as conceptions of what *landscape* might mean, they are inadequate; landscape twists into resource, energy budget and maximum carrying capacity and the archaeological landscape becomes an abstract map - sites and functions located at the broadest of geographic levels and the longest of temporal scales. We gain little sense that the landscape was likely caught up in the processes of social reproduction during the mesolithic, operating as a source of identity, power and understanding, even as it in turn was brought into being by human activity. These factors cannot be exorcised from prehistory, as so much froth on the waves of ecological time, for they are the things that distinguish the archaeology of gatherer-hunters from the ecology of animal predation.

After ten years of work on the mesolithic communities of the Inner Hebrides Mithen outlined his understanding of 'mesolithic experience' in this area (Mithen 1999). Mithen has spent most of his academic career examining hunter-gatherers and their landscapes, and has recently stated his belief that landscape is central to our attempts to understand gatherer-hunters (above). Yet his account, diverting and unexpected as it was from a man not known for his espousal of 'touchy-feely' archaeology, was thin. Mithen's 'mesolithic' experiences owed much to his ability to appreciate, in a detached fashion, the vistas and views of the dramatic landscapes and seascapes of the Hebrides, and to experience the movement of animals, tides and sun. However Mithen's experience owed little to any mesolithic community or any structure of feeling that may have existed in the past, or to potential differences in environment and ecology, and much more to supposed transcendence of experience. If this is re-population of the past then it appears to be an appropriation of these landscapes. I cannot agree that our shared, evolved 'hunter-gatherer brain' allows any *simple* connections to be made between mesolithic experience and our own at this level of engagement. Any such coincidence, based on supposed empathy, could only be facile and romantic (Low-Beer 1989; Craig 1989; Jenkins & Brickley 1989). Any discussion of the historical, *specific* landscape within which mesolithic populations came to terms with their worlds was absent from Mithen's account. It may be no coincidence that Mithen has spent many years developing computer models of the forager mind, and has been criticised for creating a 'cybernetic wasteland' in the past (Thomas 1991; Mithen 1991).

It is precisely some sense of the conditions under which certain kinds of knowledge about the landscape became possible that must be the aim of social archaeologies of the mesolithic. Here I review two recent approaches to the archaeology of landscape, by Chris Tilley and Tim Ingold, suggesting that neither offers a sufficient archaeological approach to understanding of the dialectic between landscape and identity in the mesolithic. Some of my criticisms echo the comments made about Mithen: archaeology cannot rely on transcendental experiences to understand the past. Instead I outline a contextual approach to narrating social reproduction based on material conditions existing in the past. My stress is on developing an account that opens some of the possibilities that existed in the past whilst retaining an awareness of the distinction between the perspectives of archaeologists and those of the long dead.

1.1: Landscapes of the mind?

> 'The organisation of thought and of social relations is imprinted on the landscape. But, if only the physical aspect is susceptible of study, how to interpret this pattern would seem to be an insoluble problem.' (Douglas 1972: 513)

> 'It must be asked whether landscape history can really be studied using an intellectual structure formed almost entirely around artefacts.' (Bradley 1978: 2)

Christopher Tilley is a dominant figure in British archaeology; *A Phenomenology of Landscape: Places, Paths and Monuments* (1994, henceforth PoL) is one of his more influential books and the arguments developed in it have proved very popular, especially with a generation of post-graduate students.[5] Notwithstanding this, the book is deeply flawed, and requires critical attention.

Tilley describes PoL as an experimental 'pragmatic' exercise in 'blurred genre' writing, utilising insights from 'a reading of works of a phenomenological approach in philosophy, cultural anthropology, and human geography and recent interpretative work in archaeology' (1994: 1) in order to explore

> '... the location of Mesolithic sites and Neolithic cairns and mounds and their internal chambers in relation to dominant features in the surrounding landscape – rivers, the coast, spurs, escarpment edges, rock outcrops and ridges.' (1994: 2)

Tilley is strongly critical of the notion that space is abstract or objective. Drawing on philosophers such as Heidegger and Merleau Ponty, as well as a range of human geographers, he argues that 'the meanings of space always involve a subjective dimension and cannot be understood apart from the symbolically constructed lifeworlds of social actors' (1994: 11). Space and place are part of the historically specific character of people's experience of the world. Different places (or 'locales') are caught up in this process to varying extents, some resonant with myth and meaning, others relatively unimportant. Landscape is not a neutral backdrop to social activity, but is actively caught up in the playing out of individual biographies. These biographies, in turn, contribute to the character of places themselves. Tilley is strong on the recursive relations between people and space. He also draws attention to the ways in which experience of space and place is uneven and contestable (1994: 26-27), arguing that certain media attempt to fix the character of experience in a location, consequently playing an important role in the definition and reproduction of relations of power and domination. His account includes a range of ethnographic evidence, highlighting the

[5] I am very grateful to John Roberts for discussions of PoL. His excellent unpublished study, answering a Master's Degree essay question has been invaluable.

ways in which (amongst others) Aboriginal Australians, North American Koyukon, and Mistassini Cree experience and understand landscape,[6] summarising that these studies

> 'indicate that rather than simply providing a backdrop for human action the natural landscape is a cognised form redolent with place names, associations and memories that serve to humanise and enculture landscape, linking together topographical features, trees, rocks, rivers, birds and animals with patterns of human intentionality. Significant locations become crystallised out of the environment through the production and recognition of meanings in particular places and through events that have taken place. Humanised places become fashioned out of the landscape through the recognition of significant qualities in that which has not in itself been culturally produced (rocks, rivers, trees etc) by association with current use, past social actions or actions of a mythological character.' (1994: 24)

Tilley then examines archaeological landscapes, asserting that the landscapes of the past would have been similarly rich and intimate (1994: 71). He assumes that the 'bones of the land' (1994: 73) are constant, and that 'our common biological humanity' allows us to approach the 'human visual experience of place and landscape', and, through this, develop insights into the relationships between sites and the landscape around them (1994: 74). He stresses that beyond these physical factors there is no assumption of empathy. The location of sites in the past made reference to an intimate knowledge of the landscape, one in which many aspects of that landscape, especially the 'dominant features' (1994: 2) were very important. Archaeologically we may be able to identify some, at least, of the salient features of these symbolically laden landscapes of the past, even if the particular myths and memories attached to them are forever lost. For example, in southwest Wales he argues that rock outcrops were of 'great symbolic significance' to mesolithic communities (1994: 86).

One case study examines the mesolithic and early neolithic in Pembrokeshire. This is a rich archaeological region, with many mesolithic surface scatters, concentrated on the striking coastal cliffs (1994: 76ff). Sea levels rose throughout the mesolithic, reaching the base of the present cliffs at *c.* 4700 cal BC. Tilley follows the accepted model for the character of gatherer-hunter settlement of this area, stressing the importance of the coast, and especially the marshy coastal plain that existed during the earlier Holocene. He argues that the present day cliffs would have formed dominant features of the landscape during the mesolithic, either rising inland of the coastal plain, or forming the coast itself, and stresses the density of settlement on these cliffs, often in locations with good views, suggesting that

> 'these, no doubt named, natural topographic features would have been invested with sets of local meanings and would have had the effect of pinpointing the position of camp sites and their inhabitants

[6] Revealingly, Tilley discusses the ways that *groups* of people, rather than individuals experience landscape and the subtlety of his textured theoretical account is lost.

> to populations moving around in the coastal flatlands or waters and marsh areas surrounding them' (1994: 83).

Tilley argues that 'proximity to marked changes in relief and jagged rock outcrops was clearly of great symbolic significance during the Mesolithic in Pembrokeshire' (1994: 86). He assumes the presence of early and later mesolithic material at Nab Head and Caldey is indicative of 'repeated occupancy' (1994: 84) and long-term continuity of the 'special affinity' (1994: 83) existing between mesolithic populations and these locations.

The early neolithic in the area is evidenced by chambered monuments, some surface scatters and a 'settlement' which have a 'complementary' (1994: 87) relationship to mesolithic remains. Tilley states that

> 'the major change occurring during the earlier Neolithic would appear not to be that of an 'economic' character – ... – but was primarily ideological in nature; and a fundamental part of this changing ideology involved a different relationship between groups and the landscape.' (1994: 90)

He argues that in the neolithic the already-existing ancestral associations of the landscape were appropriated and objectified by the construction of monuments in previously significant locations. He examines this by reference to monuments, many of which are located near the sea. Many are also located near outcrops of igneous or other rock types (1994: 94). Most of the monuments are not clearly visible over long distances, but the outcrops are. Tilley argues that these dominant outcrops operated as 'natural, non-cultural, non-domesticated megaliths' (1994: 99), and were significant in defining paths and axes of communication through the landscape. These were locales of myth and memory within the mesolithic landscape, drawn upon and transformed in the neolithic through the intervention of architecture.[7]

1.1.1: Essential problems

Tilley's innovative experiment presents a clear and concise introduction to a complex range of theoretical literature and to the experience of landscape in small-scale societies. It is significant in its commitment to the idea that the symbolics of landscape are an important factor in defining how people use the landscape and must therefore be considered in archaeological practice. Notwithstanding this there are significant problems with the account of prehistoric landscapes that

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[7] It is notable that 3 (out of 14) coastal sites are in cliff top locations 'recalling' those of mesolithic sites (Tilley 1994: 93), but it does not appear that there is an example of direct continuity. None of Tilley's 5 types of mesolithic site location includes reference to rock outcrops (ibid. 78-80) and there are also important differences between the two distribution maps offered for the two periods. Tilley's discovery of neolithic

Tilley offers, *especially for the mesolithic,* and it is clear that PoL does not offer an archaeological methodology (see also Bradley 2000a: 42-43).

It is worth exploring these problems and thereby highlighting areas that will be of concern in any attempt to consider the landscapes of the mesolithic. Three difficulties are important: the context of action in a place, the dominance of monuments in phenomenological accounts, and the essentialist approach to landscape. Some of these difficulties are due to the provisional nature of Tilley's avowedly experimental and brief study, exacerbated by the rather cavalier approach he takes to some of the data, but others are inherent in accounts that stress physical experience rather than historically specific context.

1.1.1.1: The importance of being contextual

Tilley states that he does not want to dichotomise ecology and symbolism by his stress upon 'the symbolics of landscape perception and the role of social memory in site location' but to examine their interaction (1994: 2, 22). However this is not borne out by his narrative. His archaeological landscapes of Pembrokeshire, for example, are incomplete. He does acknowledge the lack of research carried out on inland areas (1994: 83), but does not discuss settlement on the coastal plain in detail. This unwillingness to consider the wider landscape fails to provide us with a context for the occupation of the cliffs. He makes no real attempt to adequately integrate any discussion of economics into his arguments, merely referring in the broadest sense to movement (1994: 27ff and passim). This lack of interest in the character or extent of activity taking place in mesolithic landscapes leads to their essentialist feel: the only important features of Tilley's account are abstracted conceptions of views and dominant hills. Actual routines of movement and behaviour pale into insignificance before such dominant locales and his argument implies that the topographic dominance of the cliffs was in itself sufficient to define the pattern of settlement (see Fleming 1995). When examining the settlement of the Black Mountains, these arguments become circular. Tilley argues that neolithic monuments consolidated and objectified previously existing symbolics of landscape by focusing attention upon prominent locations, 'that these points would have been known and sedimented in social memory from the Mesolithic onwards ... seems very likely' (1994: 136).

Tilley's assertions of long-term continuity are often made without reference to the character of activities that took place in a location. Such generalising is of great concern to attempts to study the processes of social reproduction over time, especially when trying to deal with the complex

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transformation and control of space is reliant upon our acceptance of an assertion about the importance of historical processes of the mesolithic-neolithic transition. For example, it is unclear how the patterns of movement in a gatherer-hunter community relate to those dictated by a cattle based pastoral economy.

At Nab Head for example it is unclear from Tilley's account whether the earlier mesolithic and later mesolithic occupations are comparable despite a potential time span of *c.* 3500 radiocarbon years. The dangers of assuming that juxtapositions of artefacts are evidence of continuity are well recognised, and Tilley offers some abstract discussion of these problems (1994: 117ff). But this is not reflected in his argument, which side-steps the issue by asserting that continuity is striking *because* of 'the fact that local environmental conditions and ... availability of exploitable resources must have changed drastically throughout the Mesolithic' (1994: 84).

David (1989) describes the results of excavations at Nab Head I and II, allowing us to flesh out Tilley's landscape a little.[8] At NH I *c.* 40,000 artefacts were recovered, including both early and late material. Far from demonstrating continuity, these two activity phases are 'almost certainly widely separated in time' (1989: 250). The occupation at NH II is associated with *c.* 23,000 artefacts, mainly typologically late. Nab Head is famous for early mesolithic shale beads, over 690 of which are known from the site (1989: 244). One distinctive feature of the early phases at NH I is the presence of burins as a significant component of the retouched lithics, argued to be an important part of the bead manufacturing process. David argues (1989: 244-245) that in its early mesolithic phases Nab Head was a production centre for these beads. In comparison burins are completely absent from Nab Head II. Alongside this change there appear to be important shifts in the wider character of the lithic industry. At NH II microliths dominate, forming 71.4% of the retouched tools, scrapers by contrast form only 3.2%; whereas at NH I microliths form 34.1%, and scrapers 18.3% of a much more balanced assemblage.[9] It appears that the two occupations at Nab Head are quite distinct in character and possibly in time, and from this, we must believe that the significance of Nab Head as a location varied. In particular the association of this site with stone beads in the early mesolithic is interesting. Raw materials transformed for use as decoration are often caught up in complex webs of meaning, perhaps understood to be embodiments of qualities of the landscape (Taçon 1991). Production may be restricted to certain groups within society, taking place outwith the normal contexts of daily lives. The apparent decline in bead production at Nab Head was probably a *fundamental* change in people's experience of the site and Tilley makes no attempt to engage with this. The possible significance of any locale cannot be understood

these locations.

[8] David is one of Tilley's main sources for this study.

[9] Information calculated from David 1989, Table 1. Nab Head I is a mixed assemblage and the data offered in this table are composite, the distinction between the two industries is still remarkable.

without reference to the activities that took place there: that this may be difficult to assess archaeologically is no excuse for ignoring the available data.

1.1.1.2: The significance of monuments?

Tilley's account is generally more convincing when discussing neolithic monuments, especially when demonstrating how architecture acts as a focus for certain features in the landscape. This characterises many trends in recent interpretative archaeological practice, often concerned with monuments and monumentality (*e.g.* Barrett 1994; Bradley 1993; Thomas 1993; Tilley 1993). Phenomenological accounts, stressing the constraints of sensual experience can, at times, lead to a dangerous fetishisation of prehistoric monumental architecture. It may also be telling that Tilley's account of a mesolithic landscape attempts to create *natural* monuments – such as cliffs (see also Bradley 2000a) – as the only way of interpreting meaning in that landscape.

It would be foolish to deny the importance of 'altering the earth' (Bradley 1993) to the neolithic communities of the British Isles. Yet at times, our stresses have tended, ironically, to treat monuments as somehow set apart from the wider landscapes, as part of (for example) a 'ritual landscape' (Bradley *et al.* 1984). In fact these are often not really 'landscapes' at all, just networks of highly visible sites. Bradley has argued that monuments are central to the *creation* of histories of prehistoric life (Bradley 1991, 1998; Warren 1998 for review) and stated that

> 'although sites of many different kinds may contain the new styles of artefacts adopted during the Neolithic, there seems little prospect of using this evidence to interpret patterns of everyday life' (Bradley 1998: 10)

Such a statement is of deep concern for it implies that we must interpret neolithic life in terms derived from monuments alone. By extension it also suggests that we will not be able to provide any kind of interpretative account of the mesolithic. In this thesis I hope to prove that such scepticism is unfounded, and that it is possible to make some examination of the interplay between non-monumental activity and social reproduction in the past.

1.1.1.3: Skeletons in the closet

Severe problems are demonstrated by Tilley's approach to the prehistoric environment. Tilley is dismissive of the potential of palaeoenviromental analysis of the 'skin' of the land, suggesting that this detail is lost to us, stressing that the 'bones of the land – the mountains, hills, rocks and valleys, escarpments and ridges – have remained substantially the same since the Mesolithic' (1994: 73). Not only does this denigrate the possibilities of palaeoecological reconstruction and fail to pay sufficient attention to the ways in which vegetation influenced vision and movement in a landscape (Chapman & Gearey 2000), it objectifies topography as the *essence* of a landscape. This is damaging. The first major difficulty addresses the character of prehistoric woodland, and the importance of this to our attempts to understand the landscapes of prehistory. The second is the extent to which, in many eastern Scottish contexts, landscape change affects Tilley's 'bare bones'.

There are many reasons to attribute more importance to the nature of prehistoric woodland than Tilley does. For many modern forest dwellers the forest itself is vital to their understanding of themselves and their place in the world. For the Orang Asli (Malay Peninsula) for example, it is 'the link between their cultural heritage and identity, the locus of cultural identity for all these populations' (Aubaile-Sallenave & Bahuchet n.d.; for examples from contemporary and near contemporary Europe see Schama 1995, see **4.3**). It seems very likely that the woodlands of the early Holocene were not just the 'skin' of the land but *the* vital context in which biographies were extended. Some conception of their character, form and inhabitation is important to any attempt to understand social reproduction. Elegant work has been done on the character of people's sensual experience in Holocene forests (although often this has still stressed vision). Brown, for example, has presented stimulating accounts of views of the sky possible from varied forest clearings in comparison to the wider horizons of agricultural landscapes (Brown 1997a; see also Evans *et al.* 1999). Further, we must recognise the importance of a *cohabited* environment, where people, animals, plants and all of the other aspects of the world (the weather, geomorphic forces) developed together, caught up in a web of complex relationships out of which particular forms of agency became possible (Ingold 1996a, 1998a). These varied relationships were redolent with meaning. Whilst an archaeological analysis may not be able to capture the details of these relationships we should not be dismissive of their potential import, and should endeavour to incorporate these into our accounts of the past. Woodlands are discussed in greater detail in Ch. **5**, but it is clear that an account that only deals with the bare bones of these landscapes will remain abstracted and essentialist. Tilley is losing too much when he dismisses the environment, and it is not surprising that he ends up identifying rocks and relief as the dominant locales in the prehistoric landscape.

Tilley's assumption of comparative landscape stability in his case study areas is not applicable to Scotland. In part this is because Scotland is, in geomorphic terms, a young country in comparison to England and southern Wales. The Loch Lomond Stadial ended at approximately 10,300-10,000 BP, and the complex consequences of deglaciation have had a number of implications for the form of the Scottish landscape, especially in terms of reworking large amounts of loose sediment. Scotland's landscape was seismically active during the early Holocene (Ballantyne & Dawson 1997) and sea level change has been very significant. In many instances the extent of landscape change is such that it is simply impossible to recapture any sense of the prehistoric environment by maintaining a stress on topography alone. In places the mesolithic environment is not even visible *as* 'bare bones'. For example, it is difficult to address the character of now-submerged Doggerland (B Coles 1998; Verhart 1995) or the potential mesolithic coasts of the Outer Hebrides or Orkney Islands where sea level rise has completely overwhelmed the landscape. Tilley does note the difficulty of assuming landscape stability in coastal zones (1994: 73ff) but his arguments downplay the significance and complexity of these processes in Scotland (**6.4** for discussion of the Sands of Forvie). Many examples could be offered of landscape change in Scotland. The course of both the Dee and Don has changed dramatically near the coast (Ritchie *et al.* 1978: 7); and incision and terrace formation continue in the uplands (**2.5.4**). By assuming stability Tilley objectifies topography temporally, freezing the landscape. Interestingly, an assumption of stability removes the need to consider how people may have engaged with processes of landscape change whether medium to long term, such as changing sea level, or immediate and short term events such as tsunami.

1.1.2: Review

Tilley's approach to mesolithic landscapes is weak. Rather than allowing the examination of the conditions under which certain ways of understanding the landscape were generated his phenomenology has generalising and essentialist tendencies. Most ironically, given Tilley's stress on the mutually constitutive relationship between spaces and individuals, his accounts seem to have very few people in them, and feel very abstracted. If there is an agent in PoL it is the transcendental, context-less agency of Tilley himself. By downplaying context and stressing essences Tilley's account ends up feeling dichotomous and culturalist. The general impression is of a mental landscape of mythopoesis; there is little sense of the sustenance of these world-views and more an impression of cultural symbolics mapped directly onto a landscape (Ingold 1993a; Kuper 1999). Tilley also stresses vision, arguably recreating a specifically western hierarchy of the senses (McNaughten & Urry 1997), and fails to consider the embodiment of agents, instead assuming the constancy of the physical characteristics of a modern white male body (Brück 1997).

Interestingly, given Tilley's fondness for post-modern thought, there are strong hints of contextual relativism and *bricolage* characteristic of these philosophies in PoL (Eagleton 1996; Harvey 1987; Bauman 1992). Tilley does not provide any sense of a holistic, lived-in world but offers a phenomenology of a fragment of experience. His landscapes are cultural fragments, parcelled off from the contexts that would have sustained the dialectical relationships between people and place in the past. In this sense, they are not really landscapes at all. Decontextualising experience in this fashion is antithetical to the practice of any historical discipline as it exorcises history as lived and experienced from our analyses. Such phenomenologies of landscape stray into the world of heritage, where an 'authentic' experience of the past can be had simply by standing in the locations of the past. These are landscapes of false memory; they render the unfamiliar safe and validate personal or social beliefs in the present (Küchler 1993: 86). They are the landscapes of cultural resource management, the abstracted, normalised past providing us with affirmation of our disengagement from a supposed unity with the land lost to a disenchanted modernity. Curiously, and paradoxically, Bender's description of aristocratic attitudes to landscape in the late eighteenth and early nineteenth century landscape is apposite to Tilley's landscapes of the past

> 'the overall impression, the total design, is supposed to take precedence over detail, *so that the landscape becomes a vehicle for meditation*' (Bender 1998: 31 my stress).

1.2: Groping towards a new ecology of life

> 'It is easy to assert that material traditions – patterns of life and labour – are intimately bound up in the reproduction of the social world. It is rather more difficult to flesh out those ties, to chart their articulation, or to follow how they changed. ... more often than not history gives way to process; local currents of identity and authority are lost in the flow of the grander narratives.' (Edmonds 1999: 5)

In order to come to terms with the landscapes of the mesolithic we must develop detailed, fine-grained contexts within which to understand people and place (Hägerstrand 1984: 378); finding ways of addressing the interaction between routine concerns such as the provision of food, or raw materials for the manufacture of tools and the maintenance of identity and links with place. The social implications of daily economic compulsions have received little attention in archaeology: in part because of post-processual critiques of economic determinism, in part because of the inherent attractiveness of monumentality as a study. Yet the daily and seasonal rounds of routine were essential to how people understood their place within the world and must form the focus for any account of the processes of social reproduction in prehistory. Such processes can often appear to be resistant to the scales at which analytical realities are constructed (Bourdieu 1977), but they are absolutely central to any understanding of the conditions under which certain types of knowledge became possible in the past. One theorist who has been examining the ways in which forms of understanding are tied up with patterns of routine activity is Tim Ingold.

Drawing on insights from three disciplines - developmental biologists prepared to challenge neo-Darwinians, ecological psychology and the work of phenomenological philosophers – Ingold is trying to develop nothing less than a new ecology (1995: 58).[10] Ingold's *dwelling perspective* (or 'ontology of being' [1996a: 121]) requires that we 'rethink our understanding of life' (1998a: 168) and replace 'the stale dichotomy of nature and culture with the dynamic synergy of organism and environment' (1998a: 163).[11] There are two main themes here: the world is understood as a *process* not a form (see also Rose 1997 for biological aspects), and the world is inhabited, *lived in*, not just apprehended (1995). Ingold addresses the twin topics of technology and the landscape, seeing these two as inescapably linked (Ingold 1993a, 1993b, 1995, 1996a, 1996b, 1996c, 1997a, 1997b, 1997c, 1998b, 2000). I wish to focus on two main areas: the concept of the taskscape (1993a), and an examination of the 'education of attention' vital to learning how to operate within a landscape (1996a, 1998a).

[10] 'it is towards this new ecology that I am currently groping' (1995: 57)
[11] In fact Ingold now looks back on some of his early, more dichotomous arguments as sources of 'considerable embarrassment' (1995: 66), and some he even wishes to 'disown' (1996a: 148)!

1.2.1: Taskscapes

Ingold argues that archaeology is part of the same intellectual exercise as anthropology, especially in terms of the importance of *time* and *landscape*, particularly the *temporality of the landscape* (1993a: 152). Stressing the importance of a dwelling perspective Ingold critiques the dualisms that have surrounded attempts to understand the relationships between people and landscape, including culturalist accounts that stress a conceptual scheme that is supposedly mapped *onto* the environment. Instead Ingold examines the relationships between land and landscape, and time and taskscape.

Land is 'quantitative and homogenous' whereas 'the landscape is qualitative and heterogeneous' (1993a: 154); the landscape is subjective and experienced by engagement rather than apprehended through abstraction. Landscape is therefore fundamentally *social*. Ingold argues that 'tasks are the constitutive acts of dwelling' (1993a: 158) and that every task takes its place within a wider ensemble of tasks. Ingold dismisses the separation of the technical and the social (1993b), stressing that all work is social. Work involves people attending to each other and the world around them, and the interlocking resonance of tasks is particular to any one moment (1993a: 160). 'It is to the entire ensemble of tasks, in their mutual interlocking, that I refer by the concept of *taskscape*' (ibid. 158 emphasis in original). The currency of labour is time, both in the abstract sense of measured clock time as well as the personal sense of time experienced as a labourer. Thus, in a mirror of the relationship between land and landscape, clock time is abstract or homogenous whereas the temporality of the taskscape is social, qualitative and heterogeneous. Ingold also stresses that the mutual attendance, and resonance that characterises the taskscape is not limited to human, or even animate life, but also extends to the resonance of tasks with phenomena such as the tides (see below).

The taskscape refers to the mutually inter-related rhythms of attention and work – time as experienced and bought into being through particular patterns of activity. The temporality of the taskscape is therefore rhythmic: not defined by one cycle, but by the complex interlocking of different tempos, tensions and pauses (1993a: 160). The taskscape is therefore transient; immanent only within the *performance* of tasks and it cannot be captured in (anthropological) script, or reified as 'culture' any more than music can exist in a score, rather than in its performance (1993a: 161). Ingold suggests that the landscape is the *embodiment* of, or the *congealed* taskscape (1993a: 162) and that this physical solidity allows some of the features of the taskscape to remain apparent long after the movements that generated its resonances have ceased. In this sense the landscape incorporates history into people's experience of place through its incorporation into a new taskscape: a process that is always ongoing with people 'engaging perceptually with an environment that is itself pregnant with the past.' (1993a: 153). Ingold argues that archaeology is itself a kind of dwelling, and that our project, seeking the past in the landscape, is 'fundamentally' the same as that of the native dweller (1993a: 153). The task of archaeology, Ingold argues, is therefore to discover clues to the meaning inherent in the landscape, using stories to open up the processes of dwelling that may have existed in the past (1993a: 171-172). He therefore implies that the taskscapes resulting from our archaeological practice are merely another transient performance of meaning (see below).

The taskscape is a powerful concept, highlighting the ways in which the interlocking of routine activities creates conditions for understanding the world and leaves traces of these activities within the landscape which then affect people's later occupations of that area. The landscape is always undergoing a constant process of construction (1993a: 162) as activities are incorporated into it. For example a path, worn by repeated movement is both part of both the taskscape and the landscape: a scar on the landscape, guiding movement, and implicated in biographical experience, physically in the muscles during movement, as well as being a route along which the world is apprehended (1993a: 167). Archaeologically the taskscape is a useful concept because it reminds us that the temporality of activity is not just a matter of scheduling seasonal resources, but that these time frames are important in understanding identity and the ways in which people came to terms with their landscape. These rhythms are complex, diachronic, and are incorporated into the landscape that we attempt to study. Ingold does not offer a methodology for the archaeological study of the taskscape but has contributed an important theoretical tool by which to understand experience.

1.2.2: Pay attention

In three overlapping and powerful papers (1996a, 1996b, 1998a) Ingold further develops the importance of dwelling and learning. Here I draw out a few specific stresses, concerning the education of attention, enskillment and 'interagentivity' (ibid.), and Ingold's exploration of the argument that

> 'the world as perceived by hunters and gatherers is constituted as such by virtue of their very mode of engagement with it, in the course of their everyday, subsistence-related activities. ... Activities we conventionally call hunting and gathering are forms of skilled, attentive 'coping' in the world, intentionally carried out by persons in an environment replete with other agentive powers of one kind and another.' (1996a: 148-9)

Ingold argues that aspects of the landscape are not *necessarily* significant to inhabitants but only become caught up in inhabitation of the world by an *education of attention*. As an example Ingold highlights his experience as a child, taught to identify fungi by his father, a botanist (1998a: 171-

173). Ingold asserts that this lesson did not primarily involve applying an abstract conceptual scheme to fungi, but was concerned with *showing* the fungi to him: revealing the character of a small part of the world and allowing him to understand some of the properties of that. Part of this process was an 'education of attention' handed on from one generation to the next

> 'placed in specific situations novices are instructed to feel this, taste that, or watch out for the other thing. Through this fine tuning of perceptual skills meanings immanent in the environment – that is in the relational contexts of the perceivers involvement in the world – are not so much constructed as discovered.' (1998a: 173)

Of course, this observation is, on one level, mundane, being an assertion that the process of learning is vital to the ways in which individuals come to understand the world. But it does imply that the experiential landscape is closely tied up in the specific forms of education an agent's attention has received and this is an area of archaeological interpretation that remains under-explored.

For example throughout the mesolithic in the Tweed Valley the ability to spot a useful chert pebble in a riverbed was important (**7.3.2**). This was a particular way of paying attention to the world. Possibly this skill was formally taught, perhaps it was learnt by experiment: probably, in this case, mainly the latter, and possibly sub-consciously. In any case this particular education of attention was, in part, constitutive of agency; a skill that could be used or not in a given situation (Johnson 1989), manipulated in order to further the varied social strategies of an agent. This skill, and therefore these possibilities for agency may have been absent from mesolithic populations in the northeast, which has a different distribution of raw material, and are absent from the modern populations of the Tweed Valley. They were a historically specific part of the way people experienced landscape, and therefore an important part of their identity.

This example highlights that a human environment is historical and cannot be understood without reference to the character of activities taking place within it (Ingold 1993b: 432). It is precisely this commitment that Tilley's phenomenological account appeared to be lacking. Ingold stresses that these interactions with the environment are part of a wide mesh of relationships, some that we have characterised as social, some as ecological. He prefers to abandon these labels and consider instead the interlocking of many different ways of paying attention to the world, for example those of animals as well as humans (1993b: 432ff, 1996a: 129ff).

1.2.3: Feeling authentic?

Ingold's stimulating ecology offers useful concepts for any attempt to integrate the study of social reproduction and landscape in the past. He develops a number of concepts that allow us to make connections between patterns of skilled activity, individuals and the wider landscape. His accounts are highly temporal, stressing processes of inhabitation rather than the abstract symbolics of landscape delineated by Tilley. Ingold's accounts therefore should allow us to consider biographic experiences and processes and I will draw upon them in a broad sense in the rest of this thesis, focusing upon skills, routines and contexts. However there are areas of concern with his presentation of this new ecology and these should be highlighted.

Ingold's accounts do not deal as well with historical context or variability as they might. His account of Breughel's *The Harvesters [1565]* (1993a) was sharply criticised by Bender as being populated by '*ur*-peasants rather than precisely located sixteenth century peasants' (Bender 1998: 37). Ingold's discussion of his botanical lesson stresses the importance of the revelation of these organisms to him, but downplays the importance of the pre-existing schemes within which he comes to terms with them. The names of fungi, for example, are often redolent with complex series of associations, be it the rigid taxonomy of Linnaean classification or the seemingly looser meanings immanent within colloquial terminology: deadly nightshade, or magic mushrooms. There are further difficulties with Ingold's treatment of hunting and gathering as ways of perceiving the environment (1996a), which appear essentialist, despite his assertions to the contrary (*ibid.* 120). More examination of variation within the gather-hunter mode of production would be interesting. These difficulties imply that we need to contextualise our accounts rather more than Ingold does, and therefore be prepared to open out potential variation in the past. The next section of my argument will develop some mechanisms by which we may do this.

Of more significance are difficulties arising through the stress on the dwelling perspective, particularly the revelation of the characteristics of a place through engagement, hinting at an essential or 'authentic' experience of place (see below). These tendencies are weak, but are paralleled to an extent by Tilley's account, and arguably derive from reliance on Heidegger. Heidegger is a controversial thinker whose involvement with Nazism was closely connected to his philosophy, particularly to his attempt to find something 'authentic' in the face of the modern world. This connection implies that his thought must be treated very critically (Eagleton 1983: 62ff; Gosden 1994; Guignon 1993; Thomas 1996). In particular Heidgger's desire to find an 'authentic' sense of being has been argued to lead to an 'astonishing cringing before the mystery of being' where reverence was the most appropriate attitude to take to the world (Eagleton 1983: 63).[12] Heidegger's thought can be dangerously ahistorical, and his 'steadfast refusal to deal with human relations' (Gosden 1994: 45) is deeply concerning, and seemingly reiterated in the lack of

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[12] One commentator has described Heidegger as little more than a 'stupefied peasant' (cited Eagleton 1983: 64).

context in Tilley and Ingold's accounts. Heidegger's famous description of a Black Forest peasant's cottage is revealing of these concerns

> 'let us think for a while of a farmhouse in the Black Forest, which was built some 200 years ago by the dwelling of peasants. Here the self-sufficiency of the power to let earth and heaven, divinities and mortals enter in *simple oneness* into things, ordered the house. It placed the farm on the wind-sheltered mountain slope looking south, among the meadows close to the spring. It gave it the wide overhanging shingle roof whose proper slope bears up under the burden of the snow, and which, reaching down, shields the chambers against the storms of the long winter nights' (Heidegger 1972: 338; cited in Tilley 1994: 12)

Here Heidegger implies that the form of the house and its location are products of a sublime, authentic dwelling, '*simple oneness*'. We gain no sense of the house as an architectural form with long historical precedents, nor of the economic system that allows such a house to exist in the woods, and appropriates the labour of its inhabitants. Heidegger is not interested in history as lived or experienced, he is much more concerned with abstracts, such as being or time.

I do not wish to imply that either Tilley or Ingold would want to be associated with any of the extremes of Heideggerian thought. But the tendencies that arise in both of their accounts towards ahistorical, essentialist narratives are of concern to any historical discipline, especially one that wishes to examine how particular regimes of meaning were constructed and maintained rather than playing up to some sense of an immanent authentic experience of place.[13] Ingold's stress on the revelation of the world through an education of attention, especially by the mechanism of 'the clue... guiding him (the novice) towards meanings that lie at the heart of world itself but are normally hidden behind the façade of superficial appearances' (Ingold 1996a: 173) flirts dangerously with this sense of an authentic meaning. The education of an agent's attention is argued to reveal things 'immanent in the environment' and relationships between aspects of the world 'are not so much constructed as discovered' (1996a: 173). Ingold does not observe that *all* relationships *must* be constructed to the extent that the 'specific situations' (1996a: 173) within which novices are placed are rarely ahistorical accidents, but are delineated by the contexts within which agency is developed. Downplaying these contexts tends to stress the authenticity of experience.

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[13] See also Bender 1995, commenting on Gosden 1994, another example of a phenomenological archaeology.

1.2.4: Review

Ingold's work offers great potentials, but has tendencies that decontextualise experience. Partly this is because his fine-grained analyses of how people apprehend the world stress the epistemological processes of understanding rather than the historical structures within which agency is possible. His argument that as archaeologists we are engaged in 'fundamentally' the same project as the native (Ingold 1993a: 152-153) is revealing of this. For our attention has been educated in radically different ways through the discourses we inhabit, and the reality that we construct as archaeologists is inevitably different from those that may have existed in the past. The epistemological structure of our encounter with the landscape may be similar, but there is still a world of historical difference separating us from these prehistoric landscapes. In order to write an archaeology of social reproduction it will be necessary to (pre-) historically situate activity within a fine-grained landscape context whilst retaining a sense of the constructed, objectifying character of our statements. One way of examining this seeming paradox is to look at recent arguments about translation in anthropology.

1.3: Translation problems

The difficulty of understanding other cultures is a central human and archaeological dilemma. However, our discussions of these difficulties have remained at the level of method (*i.e.* Clark 1978) or interpretation (*i.e.* Tilley ed. 1995). There has been little explicit discussion of the epistemological problems surrounding the process of understanding other experiences of life at a face-to-face, non-archaeological level, nor of the central problem of representing (often within a textual narrative) ways of making sense of the world (Pluciennik 1999). Because of the more *immediately* political and moral context within which they operate, anthropologists have been concerned with these matters for some time (Atkinson 1990; Clifford & Marcus 1986).[14] One result has been a re-examination of a central metaphor for cultural anthropology: cultural translation (Clifford 1997; Pálsson 1993, 1995). Pálsson provides one statement of the common perception of this task, a description that could easily apply to the archaeologist's task

> '... the role of the anthropologist has been to go behind the baffling chaos of cultural artefacts, to discover order in the foreign, and to transfer implicit meaning from one discourse to another.' (Pálsson 1995: 27)

Said's *Orientalism* ([1978] 1995) dominates many discussions and Orientalism has become associated with the categorical misrepresentation of an-Other. A legacy of this argument implies that *any* translation is appropriation, inescapably caught up within power relations, and that true, equal, cross-cultural understanding is unlikely or impossible. Alongside these concerns the importance of the Other to categories of modern thought is well known. In this context, anthropology's admission of a 'crisis of representation' is unsurprising and the recent over-emphasis on cultural relativism and difference (Kuper 1999) was, at least in part, one way of avoiding some Orientalist excesses.

Pálsson (1995) argues that anthropological practice and narrative remains Orientalist. He argues that stressing cultural relativism actively creates barriers and divisions between realms of human experience, *actively* 'othering' people. In a remarkable claim he asserts the 'inevitable experiential continuity of the human world irrespective of time and place' (1995:

[14] Please note, 'more *immediately* political and moral': archaeology is every bit as political and moral a subject as anthropology, we both search to ask the questions about the nature of human lives within the world. Anthropology appears more immediately political because the people it purports to represent can answer back. That the dead cannot dispute our statements does not mean that our responsibilities to the people we are describing are any less serious than they would be if they could.

32) arguing that it is only assuming the need to translate between fields of experience that creates divisions (see also Wikan 1993: 186; Ingold 1993c). Thus the requirement for institutionalised translation between inhabitants of the same world is the product of particular historical circumstances. 'Massive misunderstanding is an aspect of discourse, rooted in particular historical circumstances and relations of power, in the political economy of cultural dyslexia' (Pálsson 1995: 140). Our failure to understand each other as humans and as equals, in the present, or the past, is created. Pálsson believes that one of the central contributing factors to this problem is the textual metaphor for culture, suggesting that culture can be read, and in order to move towards a 'post-Orientalist' notion of anthropology he argues that it is necessary to abandon the textual metaphors that have dominated the subject. Instead he suggests a 'pragmatist' approach, stressing the importance of daily action, dialogue and involvement. Fieldwork becomes a long conversation, the inculcation of certain skills and ways of understanding the world (also Wikan 1993). Translation, in this sense, is not the attempt to render the alien into a different language, but arises from the art of everyday getting on in the world, making sense of people around us through our mutually constituting involvement in each other, something we all do every day of our lives.

Pálsson's argument is complex and it is important to note what it is *not*. He stresses the importance of mutual involvement in order to come to terms with 'experiential continuity'. As I read it, this does not imply that there are no differences between people's experience of the world. It only implies that most differences could be overcome by the co-presence of people willing to make the effort to learn by becoming actively involved in each other's worlds. To return to an earlier discussion, Steve Mithen standing on a hillside is not having 'a mesolithic experience', but if someone was to involve him in one, *nothing* in his twentyfirst century being would *necessarily* stop him understanding and sharing in many aspects of that experience. And here it may seem, we have reached an impasse. For if there is one thing the dead of prehistory cannot do, it is engage us in their world. Archaeology, one might add, is not anthropology.

1.4: Silent dialogues

> 'we (archaeologists) also seem to have lost our nerve. We have lost sight of the fact that, for all of our technique and our rhetoric to the contrary, the study of the past is an act of imagination, bound by convention and by evidence, but creative nonetheless.' (Edmonds 1999: x)

Pálsson's pragmatist account outlines the importance of mutual involvement in the world as a way of achieving contextual understanding of human experience. But as archaeologists we are not able to engage in a straightforward exchange with the dead. In this section I outline one way of engaging with this problem.

The key is that archaeological material is not a passive reflection of past societies, but was actively caught up in the constitution of identity and experience in the past. Consequently, the fact that the ethnographic instant is not available to us does not imply that we are no longer able to achieve some kind of engagement with the worlds that may have existed in the past. By a sensitive engagement with archaeological material we should be able to attend to the possibilities of knowledge and action inherent in the past, because these materials were actively involved in interactions with the world that formed the biographies that were spun out in the past. It may therefore be possible to gather some sense of the character of these interactions and consequently *approximate* to the long conversation of fieldwork advocated by Pálsson. This moves us close to the definition of historical materialism offered by Steinberg

> 'Historical materialism is, first, born out of the experience of the present; it thus stands epistemologically on entirely different ground from that of historicism. Rather than claiming to remove the present of the historicising subject in favour of an autonomous past, which nevertheless functions to generate and justify the present, historical materialism is generated by the desire of the present subject for self-understanding as well as for an understanding of the historical object-world. The method becomes a dialectical (dialogic) relationship with that world, which in turn, is represented *not as an all-encompassing totality but rather in terms of specific material and experiential constructions*.' (Steinberg 1996a: 92-93, my stress)

Of course, this will be a dialogue of a strange kind, and the task is not straightforward, but the active character of material culture provides us with a way of engaging attentively to realities that may have existed in prehistory. It is important to be clear here about what claims I am making for archaeological material. As I have already argued I believe that much separates our engagement with the world from those of the 'native' (to use Ingold's term) or the dead. There can be no transcendental archaeological methodology. The archaeological realities that we create are distinct from those of the past; they are informed by many different contexts, many different possibilities. To hold a ‘conversation’ implies our openness to the range of meanings immanent in an engagement with another agent: if we are not open to these possibilities then conversation becomes monologue. Our archaeological approaches must therefore attempt to maintain some sense of this dialogue, retaining a sensitive awareness to the possibilities inherent in the archaeological material. Technological relationships for example, are often very much more complex than our narratives suggest. Archaeologists have tended to downplay the entangled, embedded character of the *total* social phenomena of technology (Pfaffenberger 1988) remaining broadly masculinist in our practice (Conkey 1991; Dobres 1995; Gero 1991). To articulate a 'gendered agency of prehistoric technology' (Dobres 1995: 26) requires a new degree of openness in our narratives to the possibilities inherent in the material.

In order to be able to attend attentively to archaeological material and the interactions that once surrounded it the key lies in context. Contextual descriptions require both more and less detail, and much more imagination, than they presently receive. Our accounts should involve an *opening out* of the possibilities for knowledge inherent within the relationships between mesolithic material culture and the landscape. Such accounts may help us come to terms with the significance of people's micro-contextual positions with respect to discourse (Hägerstrand 1982: 325). They are therefore a celebration of possibilities, attempts to invoke moments or images of recognition, thus maintaining some of the characteristics of a dialogue with the past (Benjamin [1941] 1992).

Benjamin highlighted the importance of the 'aura' of works of art (Benjamin [1936] 1992). By this he referred to the cult of the authenticity and reality of an object shattered by the 'age of mechanical reproduction' of the twentieth century. The aura has connections with the comments I have made about the abstracted landscapes of heritage: both are falsely authentic, relying on the ability of the observer to *fail to* observe the traces of human activity caught up within and around them, displaced by the aura. Steinberg notes that 'the aura of an historical object or discourse posits all contextual reality into a shadow realm of marginalisation. The destruction of the aura amounts to the reillumination of the margins' (Steinberg 1996a: 94-95; see also Eagleton 1981 on traces; Lowenthal-Tsing 1993 on marginalisation in narratives). Contexts can re-illuminate the varied ways in which material culture may have helped to constitute identity in the past, especially in terms of those groups who have often been marginalised within archaeological narratives.

Two recent accounts of the British mesolithic are good examples of contextual analyses closing down possibilities in the past. Bonsall, in his discussion of the 'Obanian' middens of the west assumes, on the basis of ethnographic analogy, that women and children were involved in shellfish collection (1996). Murphy (1996), in a detailed study of the microwear on artefacts from Mt Sandel in North Ireland, also assumes that gendered tasks can be identified on the basis of ethnographic analogues. In a British mesolithic context there is no evidence for strong associations between gender and particular tasks, such as consistent skeletal evidence of differential trauma caused by repeated activity or consistent grave good packages (see Gilchrist 1999 31-53). Despite their seeming subtlety the attributions made by Bonsall and Murphy are simply assertions. I would argue that the task of an archaeology of gender must consist of more than the recognition of women in roles already familiar to us (*contra* Hayden 1992; see Conkey & Gero 1997). It must move towards an understanding of the historically specific possibilities for domination and contention embedded in the material culture used by people and the landscape they inhabit. Bonsall and Murphy's studies limit these possibilities by familiarising the past through recreating the present in the past.

1.5: Review and prospect

In this chapter I have examined some ways in which we might approach an archaeology of social reproduction by focusing on landscapes. Tilley and Ingold offer valuable insights, but can be criticised for failing to pay sufficient attention to historically specific contextual encounters and for hints of transcendentalism. Both seem to create landscapes akin to those of heritage, where historical detail is lost, and with it the possibility of engaging meaningfully with the character of human experience in the past. Pálsson, in outlining a post-Orientalist notion of translation, stresses the lack of boundaries between human experience, suggesting that a 'long conversation', or mutual attendance to the world, is essential to understanding the historically specific conditions under which forms of knowledge are created. The active, recursive character of material culture means that our archaeological materials allow us to *approximate* to a 'conversation' with the past. In order to attend to this 'conversation' it is important to remain as open as possible to the possibilities inherent in this material culture, and consequently I have argued that our narratives and contexts should be as open as possible. Such an account may reduce, although it cannot eliminate, the degree of objectification noted in many accounts of gatherer-hunter lives. My intentions are not to strictly define and delineate the character of mesolithic experience, but to offer alternatives to our experience. In this sense, at least, a long conversation may be rewarding.

Chapter 2: Data review

> 'Brooding consists in the activity of sifting through pieces of worthless material, grubbing with one's hands, fingering things, driven by an unarticulated but nevertheless compelling sense that fragments of experience, rearranged in some lost, non-arbitrary construction, might spell out some large structure of significance' (Pensky 1996: 170)

Our ability to construct any kind of interpretative engagement with contexts, experiences and landscapes of mesolithic eastern Scotland is entirely dependent on a range of material culture existing in the modern world. In this chapter I appraise the evidence, assessing the character of this material. Lithics form the basis of this review, not simply because they are the dominant class of evidence, but because they are the analytical basis of this thesis. I also introduce the full range of surviving mesolithic materials before discussing the combination of these in sites of different type. A range of biases are outlined, stressing the difficulty of establishing general models for their significance. Some small-scale fieldwork, designed to appraise the extent of some biasing factors, is described.

2.1: Data collection

The data set is dominated by stone tools, often with little or no structural remains or archaeological context. This evidence has never been collated into a single gazetteer or database (Saville 1998) and is a deeply problematic resource. But this evidence cannot be ignored, especially if we seek to understand how the landscape was inhabited, rather than solely study isolated well-preserved sites. It is therefore necessary to consider the relationship between excavated and fieldwalked assemblages, including old or amateur collections.

Distinctions between excavation and fieldwalking as forms of data-recovery are important, but can be overemphasised, especially given increasing use of test pits and trial excavations with fieldwalking. In general, excavation allows a more refined picture of human lives in the past than is possible from surface material. For example Coles argued from fieldwalked evidence (J Coles 1964) that the sites of Barsalloch and Low Clone in Dumfries and Galloway incorporated the same stonecrafting tradition. However excavation demonstrated that the inhabitants of Barsalloch removed flakes and blades in a structured way from multi-platform cores, whilst at Low Clone a more flake-dominated industry was based upon one- or two-platform cores (Cormack 1970; Cormack & Coles 1968).

That excavations appear to allow a greater level of control over data, as opposed to possibly incomplete or unrepresentative collections from fieldwalking may seem unsurprising. However we should not dismiss the accuracy of all surface collections. At Little Gight excavations revealed that Mr Buchan collected very thoroughly (Baird & Finlayson 1994). My collaboration with Bob Knox allowed a further appraisal of standards of recovery, comparing extensive surface collections from Manor Bridge with excavated material (all spoil was sieved at 5mm) (Figure 2). Surface collections adequately represent the raw materials utilised at Manor Bridge. The size of finds differs, but not significantly: surface finds are only a little larger. The types of artefact provide the clearest indication of bias: regular flakes, blades and retouched artefacts are over-represented in the surface collection. Although we might expect this to reflect the easier recognition of regular artefacts the high proportion of chunks in the surface collections indicates some complexity to these factors. Overall Knox's collections are representative of the material recovered by excavation and are used throughout this thesis.

Just as fieldwalking standards vary we cannot assume that all excavations are alike. Notwithstanding differences between modern excavations and those of the past, the sampling strategy has important implications regardless of the ability and professionalism of those concerned (Mithen & Lake 1996). This is particularly important given that mesolithic sites are sometimes discovered accidentally during the excavation of other sites. For example, the recovery of lithics from sites discovered in Aberdeen during excavations expecting to examine the medieval burgh was affected by excavation techniques utilised. Kenworthy (1982: 212) suggests that the high representation of débitage at the Green was partly a consequence of sieving. He also argues that the discrete scatter at the Green facilitated the identification of minute débitage by hand. This reminds us that archaeological attentiveness is not objective, but contextual: the character of the material in the ground at Aberdeen transformed the ways people searched for artefacts. In the same fashion concentrations of surface finds can reflect increased attention to an area provisionally identified as a discrete scatter, or perhaps where a retouched artefact was found.

Despite the importance of forms of archaeological praxis in moulding archaeological realities many of the seeming polarities between excavated and surface data are dissolved by the evidence itself. Whilst modern excavations *can* recover exceptionally sensitive levels of data they are ultimately reliant upon the remains they explore. Even when identified many mesolithic structures and features are ephemeral, and our contextual detail is less than we might wish. Furthermore, many early lithic scatters are now redeposited or mixed (**2.2.1.1**).

Of course, many surface collections, especially antiquarian ones, are clearly not representative and their use presents modern archaeologists with a range of well-known problems (Gardiner 1987), especially given our impoverished understanding of stone tool craft in eastern Scotland (for discussion of similar problems in Ireland see Woodman 1987). One important outcome of long histories of collection in lowland Scotland has been that many collections have been scattered between museums and can therefore be very unrepresentative. For example Mulholland (1970) argues that flint was virtually absent from the Upper Tweed valley, including the Yarrow, a tributary running almost parallel to the main river. In fact collections from the Yarrow in Hawick Museum are flint dominated, whilst those in the Hunterian are chert dominated, possibly indicating the use of a local outcrop. Because of the particular history of collection in Scotland a quite distinctive and potentially misleading archaeological reality has been created. This reminds us of the need to carefully assess any statements based upon antiquarian collections.

In conclusion, instead of rigidly separating fieldwalked, amateur and excavated collections we should think in terms of a continual range of detail. In contrast to antiquarian collections, excavated and fieldwalked assemblages offer us a different series of opportunities and possibilities. Excavations offer only snap-shots, at exceptional detail, but with a very narrow focus. Fieldwalked collections offer some potential for examining networks of technological decisions manifested throughout the landscape. Different techniques and records create distinctive archaeological realities with varied potentials and we should dismiss none of them. This is particularly significant given the sheer bulk of antiquarian material in our museums. We must attempt to make some use of this material, or perhaps reconsider whether its curation is a sensible investment of limited funds.

2.2: Data sets

2.2.1: Lithics

I discuss my approach to lithic analysis and interpretation in Ch. **8**. At this stage, I offer a general review of the material available.

2.2.1.1: The late-glacial

There is little evidence for stone tools from the Lateglacial period in Scotland, let alone eastern Scotland. A number of tanged points from Tiree, Orkney, Jura and Islay (Finlayson & Edwards 1997; Livens 1956; Mercer 1980) have affinities to upper palaeolithic ('Ahrensburgian') types (Morrison & Bonsall 1989: 137-139). These rolled and/or poorly provenanced objects *may* indicate some activity *c.* 11-10,000 BP. Woodman is sceptical, arguing that tanged points have been discovered in Manx contexts at 7700 BP, and noting that pieces appear as 'sports' in larger assemblages (Woodman 1989: 20-21). However Finlayson (1999) argues that these finds are noteworthy because they are single artefacts, not clearly part of assemblages. Saville (1999) has suggested that an angle-backed piece from Fairnington in the Tweed Valley is late palaeolithic but in isolation it is difficult to assess this claim. Aside from single finds, an interesting scatter has recently been identified at Sand, Skye where large numbers of tanged points have been discovered in association with charcoal on the late glacial shoreline (Wickham-Jones pers. com.).

2.2.1.2: The early mesolithic

Typologically, early mesolithic industries are characterised by a restricted range of large 'broad blade' microliths: obliquely blunted points, isosceles triangles and trapezes (Jacobi 1973, 1976, 1978). There is little unambiguous evidence for early mesolithic stone tools in Scotland, and it is difficult to isolate early mesolithic assemblages, but type-fossils have often been identified. Morton and some of the Jura sites appear to have early mesolithic associations (see below), Kenworthy (1975: 74) argued that some of the stone tool industries of the Dee valley and the northeast are 'Boreal',[15] and Lacaille observed broad blade forms in the Dee and some of the Tweed material (1954; see below).

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[15] 'Earlier assemblages (are) characterised by the use of grey flint and the dominance of larger obliquely truncated bladelets and isosceles triangle microliths' (Kenworthy 1981: 7). Kenney

It is difficult to assess these claims, which are often based on mixed assemblages and type-fossils. The site of Morton A is revealing of the character of these debates (J Coles 1971; also Lacaille 1944). The apparent association between a broad blade flint industry and radiocarbon dates of the later seventh millennium BP at Morton appeared to suggest that early mesolithic stone working traditions in Scotland persisted some 2500-2000 radiocarbon years after they had been replaced in other European contexts (Myers 1988; and responses Bonsall 1988; Clarke & Wickham-Jones 1988; Woodman 1988). However, rather than representing a long-term local survival of distinctive traditions it is likely that the site of Morton was reoccupied during prehistory and the lithic assemblage is a complex palimpsest *including* earlier mesolithic types. Bonsall (1988) bases his reconstruction on geomorphic data and assumes occupation by groups utilising early mesolithic technologies before 9300 BP, at a time when Morton was in close proximity to the coast, and occupation by later mesolithic groups after 6800 BP, when Morton was coastal again. Recent dates from bevel ended tools from the site show more occupation at *c.* 5100 BP (Bonsall *et al.* 1995).

Coles makes few comments about the broader associations of the artefacts, noting morphological variety. He discusses problems with repeated occupations (1971: 305) but did not identify marked divergent phases of occupation beyond commenting that 'large edge tools' from T18, 20, 21, 23, 28, 38 and 46 'might represent a chronologically early element' (J Coles 1971: 308). However they are quite rare in most contexts, excepting T.46 (a complex series of superimposed occupations) (1971: 323ff) and have not figured highly in most discussions, which narrowly focus on microlith typology. Confusion surrounds these detailed arguments and the failure to define terms and the reliance on illustrations of type-fossils is frustrating (Figure 3). Coles describes trapezes as 'practically non-existent', identifying only three (J Coles 1971: 308), yet Myers (1988: 25) describes the industry as a 'non-geometric industry containing trapezoidal microliths essentially identical to those from ... Star Carr'. Woodman (1988) argues that Coles never suggested Morton was non-geometric, yet Coles suggests that 'geometric forms' such as needles and rods are unknown at Morton (1971: 319). Whilst these difficulties are confusing, there are more serious problems. Myers extracts diagnostic type fossils from contexts: in T47.I for example, an 'early mesolithic' isosceles triangle, in T46.I a scalene triangle (Myers 1988: 26ff). Not only can Myers be criticised for only selecting pieces suiting his argument (Clarke & Wickham-Jones 1988: 35) but any reliance on type fossils is dangerous as broad blade forms do occur

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criticised these arguments, believing that although some early forms might be present the majority of sites displayed only 'classic geometric microliths and rods' (1993: 247) in geometric flint industries in Scotland. Diagnostic 'early' forms, such as trapezes, have been found at Shewalton, in a post-transgressive context (Morrison & Hughes 1989) and the complex Jura sequences show that larger microliths are still produced alongside geometric forms (Mercer 1968-80; see also Woodman 1988). Because of these concerns, and the difficulty in identifying which aspects of the industry are clearly 'early mesolithic' rather than mixed, it is difficult to characterise the Morton assemblage in detail. Reanalysis of the Morton material, not just its illustrations, should be an important aspect of future research in the eastern mesolithic.

Outside of the study area, more details come from Lussa Wood, Glenbatrick Waterhole 1 and Lussa Bay on Jura (Mercer 1968-80). At Lussa Wood broad blade artefacts appear to have been re-deposited into a context containing narrow geometric microliths. Carbon dates of *c.* 8000 BP in this context post-date the broad blade industry and Bonsall (1988: 32-3) argues that the broad blade occupation pre-dates 9000 BP. At Glenbatrick two discrete concentrations of artefacts were recovered. Glenbatrick 1 has a broad blade character (Mercer 1974) including the 'most convincing' examples of early mesolithic forms in Scotland (Finlayson & Edwards 1997: 115; also Woodman 1989: 13). At Lussa Bay redeposited flints are formally similar to the trapeze/triangle industry seen at the other two sites.

Comments about stone working in these early phases are necessarily comparative with later assemblages and are complicated by possible functional differences between sites. Large triangles, trapezes and obliquely blunted points are common. Cores reflect structured approaches to reduction of beach pebble flint. Asymmetrical laterally compressed cores, alongside their by-product, flakes partly backed with cortex, are common, and may reflect a concern with maximising returns from the raw materials. Scrapers are significant; end-scrapers are an important diagnostic form (Mercer 1970: 11). These include a range of lengths but forms are quite standardised and production is almost exclusively based upon flint. Later sites on Jura indicate less of a concern with standard forms. Blades appear to be very important in these early industries.

One possible early mesolithic site was identified during my review of Tweed Valley material. Many of these assemblages include both narrow- and broad-blade types; for example microliths from Springwood Farm include 21 broad-blade and 5 narrow-blade types (Wickham-Jones n.d. a.). It has been argued that the appearance of the two types is of culture-historic importance (Lacaille 1954; Mulholland 1970; Wickham-Jones n.d. a.), but due to the difficulty of palimpsest it is difficult to avoid problematic reliance on type fossils. However, complex assemblages from Craigsford Mains, Lauderdale (Figure 67 for location) include a number of early mesolithic associations and are, in some senses, distinct from other assemblages in the region. Early features of the Craigsford Mains material have been noted before (Morrison & Bonsall 1989: 141), but this review discussed only the microlithic aspects of the assemblages, and this reliance on type-fossils is potentially problematic.

Craigsford Mains has a long history of collection with variable recording and the assemblages from the site are very mixed, including patinated and fresh flint, microliths, microburins, plano-convex knives, lop-sided and barbed and tanged arrowheads, as well as polished flint axes and saws. Broad blade types dominate the microliths: oblique truncations are significant (Mulholland 1970) but a variety of other forms are present. Lacaille identified end scrapers on blades as a significant aspect (Lacaille 1954: 163-165) (Figure 4: LHS, 5-6). The raw materials utilised are also very interesting. Of the 1,304 artefacts identified by material in the NMAS acquisition list 95% are varying shades of flint, most of which is slightly unusual, not known locally. Although this dominance might be supposed to reflect collection bias, the W Munro collection from the site is also dominated by flint despite the fact that at all other sites Munro routinely collected chert and chalcedony. This seems to indicate that the dominance of flint may be real, and that Craigsford Mains is not directly comparable to other Tweed Valley sites, the majority of which are later mesolithic in date and utilise large amounts of blue-grey Southern Uplands chert (**7.4**). The distinctiveness of the industry is also indicated by the importance of very large broad blades almost exclusively manufactured on flint (**7.4.3.2**). Lacaille (1954) noted this tradition, which he suggested was also adduced at Dryburgh, but to my mind Craigsford Mains is distinctive. Many of the cores are of distinctive types, manufactured unifacially across pebbles, leaving a distinctive cortical remnant (of the type described by Mercer as asymmetrically backed cores) (**7.4.2.2**). These cores are present on other Tweed sites, but do not dominate like this.

Although mixed, the assemblage from Craigsford Mains is therefore differentiated from other sites in the region, and all of the distinctive features are characteristics of early mesolithic industries, closely paralleled in Jura for example. In isolation none would be suitable evidence of an early mesolithic date but in combination they are very suggestive. Unfortunately the precise location of the site is unknown (**App. 3.1.5**), and it is not possible to assess whether an isolated early mesolithic industry could be identified in the field.

These scattered early sites are of some interest and seem to reaffirm the comparative uniformity of early mesolithic stone-craft over large areas of Europe (Jacobi 1976).[16] In particular the production of fairly standardised stone-tools seems to be important. This kind of structured approach to lithic manufacture may be associated with very mobile communities (Edmonds 1987), possibly an 'open' rather than a 'closed' society (Lourandos 1997). Interestingly there is little evidence at any of the earlier Scottish sites for the core axes listed by Jacobi. One possible axe is known from Morton, but Saville (1995: note 1) is doubtful that it is mesolithic.

2.2.1.3: The later mesolithic

Later mesolithic stone tools are often described as narrow-blade or geometric. The descriptions mainly refer to microliths, which are smaller and more diverse than early mesolithic forms. As noted above, occasional broad blade forms appear in later mesolithic assemblages in Scotland. Most later mesolithic assemblages in Britain post-date *c.* 8500 BP (Jacobi 1976). The earliest dates in Scotland are from Rum, Fife Ness and Daer, Lanarkshire. Rum and Fife Ness are both close to 8500 BP (Wickham-Jones 1990; Wickham-Jones & Dalland 1998) and a single date associated with a geometric industry at Daer 1 is 9075±80 BP (AA-30354) (SAN 28, 1998). This date, from *Pomoideae* charcoal in a pit with microliths is slightly problematic, seemingly too early in a wider context.[17]

Myers (1987) argues that the numbers of microliths on later mesolithic sites is high because of their role as 'slot-ins' in a component technology and they are found very frequently throughout Scotland (Figure 4). Microliths, and many other stone tools, were often not used in the isolated form we discuss them, but as parts of composite tools, and our focus upon formal types is unlikely to replicate categorisations in the past. Microlith types include varieties of rods, crescents, scalenes and backed blades and identifying categorical 'pigeon-hole' types is difficult (Finlayson *et al.* 1996). Microliths also vary greatly in size; one complete crescent from Dryburgh Mains, Tweed Valley, is less than 3 mm. in length (pers. observ. Walter Elliot collections). Microburins are also present on many sites, in narrow and

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[16] There is an inevitable circularity in using comparative analyses to identify the presence of the early mesolithic in Eastern Scotland and then arguing that it is comparable to the early mesolithic in other areas.

[17] Whereas the earliest dates for later mesolithic industries, in Southern France are comparable (Rouffignac 9150±90 BP, Culoz sous Balme 9150±160 BP [Jacobi 1976]) the dates for the latest early mesolithic sites in Northwest Europe often fall at *c.* 8700-8900 BP.

broad blade forms. Our understanding of microliths is still developing, especially given problems with dating many scatters, and sites can raise surprises. At Fife Ness a range of geometric crescents, a type that is often quite rare, dominated an assemblage of 36 microliths (Wickham-Jones & Dalland 1998). The function of microliths is unclear; microwear analyses suggest they were used for many different purposes and that simply interpreting microliths as armatures is inadequate (Finlayson 1990; Finlayson & Mithen 1997). The proportion of microliths in scatters varies (**3.1.1**), and a small blade assemblage from Spurryhillock reminds us that not all mesolithic sites involved the deposition of microliths (Alexander 1997).

Scrapers are often present in later mesolithic assemblages but vary greatly in quantity and type (Lacaille 1947); it is not clear what this implies. Standardised shapes are not dominant and scrapers range greatly in size although convex edges are very important. End of blade or flake forms are significant, as are small 'thumbnail' scrapers. Core scrapers are a small aspect of mesolithic assemblages. Many scrapers from the Tweed Valley are tiny: distinctive round scrapers less than 12mm in maximum size are known from Dryburgh Mains (Corrie 1914, 1916; Callander 1927) and the Dookits (**App. 2.1**) and appear to be an important diagnostic type, sometimes described as Tardenoisian. Some scrapers from the Sands of Forvie include a distinctive shoulder (**6.4.2.3**).

Burins are rare in most assemblages, but especially in the Tweed Valley, Mulholland for example identifies only 11 in total (1970: 89 see Fig 3.3, 20). One important consideration may be that burin facets are difficult to recognise on some raw materials in the Tweed and that the natural fracture properties of chert can create chunky, chisel-like edges. Furthermore, it is possible that burins were not recognised in the field by the collectors who Mulholland relied upon. Recent analyses of material in the Tweed identify burins (Wickham-Jones n.d. a).

A notable characteristic of later mesolithic assemblages in eastern and western Scotland is the absence of axes or heavy core tools. Edge-ground axes, common in Ireland and Wales, and flaked axe-heads or picks are almost certainly absent. Lacaille illustrates two Tweed Valley tranchet pieces from Clackmae and Dryburgh arguing that 'these tools were no doubt manufactured for cutting wood' (1954: 166), but the former is only 54mm and the latter 24mm in length, which seems too small to be classed as an axe (Fig 4. RHS 39-40). An edge-ground stone axe head is recorded from Cambwell, Peebleshire, part of a nineteenth century collection (Saville 1995). It is an elongated sandstone pebble (145 x 34 x 20mm) bifacially flaked at the butt and bifacially flaked and ground at the cutting edge. Parallels are rare, but the axe might be mesolithic.

Alongside formal retouched tools mesolithic assemblages include large amounts of waste, cores, flakes and blades. Many mesolithic industries focused on the production of regular blades, and despite often being defined as 'narrow blade' later mesolithic industries include a wide range of flakes and blades[18]. Analysts assume that proportions of blades >20% (the 'Lamellar Index') in an assemblage reflects an emphasis on blade production. This figure is derived from analyses of French upper palaeolithic industries (Wickham-Jones 1990: 76)) and is not necessarily appropriate to understanding later mesolithic industries in Scotland, especially those manufactured on varied raw materials. Wickham-Jones (n.d. a), for example, does not use chert or chalcedony to calculate the Lamellar index.

A wide range of core types and a variety of percussive evidence are known: conical, cylindrical and more irregular cores are common and blades were removed from single, double and multi-platform cores. Core types and sizes vary in different regions, probably reflecting the influence of raw materials as well as traditions of manufacture (**7.4**). Not all cores are very formalised and there is a range of reduction technology; bipolar knapping is also well known. Indirect percussion appears to have been significant for the production of blades.

Raw materials will be discussed in depth in **7**, but many writers have commented upon the localisation of procurement in the later mesolithic. Evidence from Morton (J Coles 1971) and the Tweed (**7.3.1**) suggests that stone procurement could involve formal quarrying, not just casual collection, although this was clearly important. There is little unambiguous evidence for the large-scale movement of raw materials in the later mesolithic in Scotland although some small-scale movement is likely.

2.2.1.4: Discussion

There are a number of important issues arising from the review of the stone tool data set. A major problem is with dating material. Our chronologies of stone crafting are weakly developed and many mesolithic scatters are the product of fieldwalking, either antiquarian or modern, and consequently have no absolute date. Even when excavated it is still difficult to find dateable material. In the absence of this information we are reliant upon inference, whether this be geomorphic, typological, or some other form of archaeological intuition, in order to date archaeological sites. Dates are sometimes attributed on the basis of associations with geomorphic features. These include raised beaches, where links between mesolithic settlement and sea levels are often adduced (see above). This pragmatic approach runs the risk of circularity, especially where the significance of marine resources is stressed as a consequence of the association of sites with coasts. One of the general indications of the data from the east is that the landscape was extensively utilised and not just the coast.

In any area of Britain few stone-tool assemblages can be dated by type beyond the broadest of chronologies. For example the 'later mesolithic' is *c.* 3500 radiocarbon years long, and it seems very unlikely that stone-working traditions remained static throughout this period. It has been argued, for example, that industries dominated by scalene triangles gave way to those dominated by rods (Woodman 1989) although at present these arguments are hard to appraise. It is also important to divest ourselves of the too easy equation of microliths with gatherer-hunters. Pollard has commented on the possibility of the maintenance of microlithic technology into later periods of prehistory (see Lelong & Pollard 1998: 134), although there is little unambiguous evidence for late use of microliths. In southern Norway there are a series of important shifts in stone tool technology throughout the mesolithic (*c.* 10,000-5200 BP) culminating in a non-microlithic *latest* mesolithic reliant on bone and antler technology (Ballin 1999). This does not imply that there *is* a non-microlithic mesolithic or that developments in Norway are paralleled in Scotland, but serves to highlight that our archaeological reality is constructed in the present and bears a problematic relationship to realities that may have existed in the past. A non-microlithic mesolithic in eastern Scotland would be very difficult to recognise without radiocarbon dates.

As noted above, many sites are reoccupied, and their assemblages are complex palimpsests. Palimpsest is a vital consideration for stone tool assemblages, particularly in the context of our poor understanding of developments within the mesolithic period. Too often, our assumption that the mesolithic is a static phenomenon is reflected in discussions of problems

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[18] Pitts and Jacobi (1979) suggest that the phrase narrow blade is inappropriate, arguing that the breadth:length ration of blades and flakes found on later mesolithic sites exceeds that from early mesolithic sites

of residuality or mixing where the impression is that it is only artefacts of a different period that create analytical difficulties. However many mesolithic sites have complex histories of use and reuse and these episodic patterns of settlement create complex material correlates that present major problems for stone tools analysis. These difficulties will not be resolved by searching for and dating single occupation sites such as Fife Ness (Wickham-Jones & Dalland 1998). Informative although they are, it is clear that this type of site represents only one element of wider Mesolithic settlement patterns.

These difficulties with stone tools are exacerbated by consideration of the influence of raw materials on our ability to recognise stone craft as mesolithic (or otherwise). Although microliths can be manufactured on a range of materials (from siltstones to flint) the characteristic blade-dominated form of mesolithic industries is not possible on all raw materials. The character and extent of mesolithic quartz working, for example, remains obscure, it forms a small part of a range of assemblages, and there are hints that it is important in the later phases of Mercer's Jura sequences, but these industries are often rather unspecialised. There remains the possibility that in some areas with abundant natural quartz mesolithic stone working may take very different forms, not easily recognisable as mesolithic due to our flint-influenced expectations of these industries (Holm & Knuttson eds. 1997). Such areas might include the western Isles, or areas of the eastern Highlands with extensive deposits of high quality quartz. The survey of the Burn of Calleter (**2.6**) attempted to identify the mesolithic in a quartz rich area in order to assess this factor.

Stone tools remain a problematic archaeological reality. Our present understanding of the chronology of stone crafting is inadequate, and consequently our use of objectifying analytical categories such as 'later mesolithic' obscures variation in the past. Notwithstanding these varied problems stone tools provide *the* vital evidence for interpreting the mesolithic landscape and the studies developed within this thesis demonstrate the potentials of the database to inform us of social relations in the past.

2.2.2: Other artefact types

Other artefacts include bone and antler tools, coarse stone tools and those made in a range of other materials.

The tiny number of bone and antler artefacts represents a small proportion of a once common material (Figures 5, 6). Most finds of organic tools come from coastal contexts, especially in conjunction with skeletons of beached whales found in carse clays in the Firth of Forth (Lacaille 1954: 167-171). Many artefacts are now lost, such as the partly hafted axe from Blairdrummond, Stirling (NS79NW 8) or two 'stags horns' from Airthrey Castle, but a range of perforated antler beam mattocks seem to have been especially significant (Smith 1989) and a borer is also known from Causewayhead, Stirling (Lacaille 1954) (Figure 5.2). Beam mattocks in Britain date from *c.* 6560-5350 BP (Bonsall & Smith 1990): the Meiklewood artefact (Figure 5.4; Smith's type C) to 5920±80 BP. Despite an association with whale remains it seems unlikely that these artefacts were specialised whale blubber axes; strandings would have been unpredictable events, unlikely to lead to the development of a specific tool kit (Smith 1989). (Of course, this argument assumes that strandings *were* chance events, and not caused by deliberate hunting.) In any case wear marks on many mattocks suggest that digging was a common use, although it seems likely that these tools were multipurpose. Antler mattocks can be large, heavy-duty items. Experimental work has shown them to be effective for chopping wood (Bonsall *et al.* in press) and this may provide one explanation for the apparent absence of heavy lithic technology in the region. Many mattocks have been found in coastal or riverine locations. Smith argues that

> 'their use may have been specifically related to activities on the riverbank or the foreshore such as digging for roots, aquatic plants, small animal, mollusca or bait, setting snares of fish traps and occasionally the butchering of stranded marine mammals.' (Smith 1989: 283)

Zvelebil connects this distribution to the likely intensive use of plants in these areas (1994: 55) but the dominance of riverine or coastal locations may be a product of preserving conditions.

A uniserial barbed bone point from 'Glenavon' has been argued to suggest early activity in the east (Figure 6; Morrison & Bonsall 1989: 139; Lacaille 1954: 184-5; Ralston 1997). The point has parallels with upper palaeolithic ('Maglemosian') artefacts, dating to *c.* 12,500-9000 BP, and 'Glenavon' has been understood to be in Banffshire (although there are other Glenavons in Scotland). However, the Glenavon point lacks any real archaeological context. It formed part of a collection gifted by Henderson-Bishop to the Hunterian Museum, and was discussed in letters exchanged between Bishop and the curator, Anne Robertson. Bishop concludes that 'the "Glenavon" harpoon always seemed to me doubtful, I do not remember how I got it. If I labelled it, it was on the authority of the seller, but it was probably labelled when I got it.' (HB to AR 27/9/1950. Letter in Hunterian Museum archive). Bishop purchased items from all across Scotland and Europe, and lived in Switzerland where he worked on palaeolithic material. The Glenavon bone point is dubious evidence for early activity. An intact six-pronged biserially barbed harpoon was recently discovered in the Forth near Blackness Bay (Figure 6; Saville 1996), dating to 6030±55 BP (Saville pers. comm).

Thirty-eight bone bevel-ended tools were found at Morton B (J Coles 1971); one dates to 5180±70 BP (Bonsall *et al.* 1995). These artefacts have been argued to be associated with leatherworking or limpet consumption (Finlayson 1995, 1998: 25) but an experimental study of wear polish on bevel-ended tools has demonstrated that they are most likley to have been used for gouging limpets from their shells (Griffitts & Bonsall 2001). 'Round nosed bone chisels' and stone points similar to 'Obanian' types are recorded from an undated midden on Inchkeith (NMR: NT28SE 2). A few other bone and antler tools are known: a possibly smoothed whale rib from Causewayhead and a possible stick or handle in association with a whale at Cornton Brickworks (Sloan 1993: 43). A single red deer bone skewer pin (230mm in length) was recovered from the central area of the Nether Kinneil excavation (Sloan 1993: 97). The chronology of this site is complex, but the central area of the midden is likely to date to after 4,355 BP.

A very small number of worked shells are also known from the east coast but are not securely dated; most are likely to be neolithic. Sloan discusses pierced oyster and *Turitella communis* from Nether Kinneil (1993: 100-101) but these, like the bone pin, are from the central area of the midden and are likely to be post-mesolithic. A *Turitella communis* ornament was recovered from middens at Freswick Bay, Caithness (Lacaille 1954: 267), which also included bevel-ended points, a bone pin, lithics and a range of pottery including Beakers and (?)impressed ware (1954: fig. 118). It seems very likely that this midden is mixed but broadly comparable to Nether Kinneil. Coles identifies an enigmatic possible pierced shell (*Aporrhais pes-pelecani*) from Morton (J Coles 1971: 347).

Coarse stone-tools include a range of hammer-stones, anvils and bevel-ended tools as well as controversial artefacts such as waisted pebbles or 'sinkers' from the Tweed (Figure 7; Corrie 1913, 1916; Lacaille 1954: 166-167; Mulholland 1970; **5.3**). Perforated hammerstones or 'mace-heads' are known from the same restricted area of the Tweed. Mulholland states they are known from 16 sites and tend to be circular (Figure 7.1-2), believing that they are early in date. Lacaille (1954) mentions Baltic parallels, and that they all derive from surface collections. Many interpretations of these artefacts are possible – for example, they are very similar to perforated stones used as digging-stick weights (Figure 8). A hollowed sandstone was recovered from Fife Ness: 'there are many possible tasks for which a small hollowed stone, such as this, might be used, including the preparation of pigments, and vegetable or other food materials' (Wickham-Jones & Dalland 1998; Figure 7.3). An almost identical artefact was recovered from Gleann Mor, Islay (B Finlayson, pers. comm.). A series of 'pencils' of ochreous rocks from Morton (J Coles 1971: 296, Fig. 13) also hint at the importance of (?personal) decoration.

A number of log-boats that may date to this period have been recovered from deep within carse deposits, for example, upon a Boreal land surface at Friarton, Perth (Lacaille 1954: 66; see Gregory 1998: 42ff. for review). These boats are contentious but it may be overly pessimistic to deny the circumstantial evidence for log-boats in the mesolithic period (Saville 1999; for discussion see Finlayson 1998: 29; Gregory 1998; Sloan 1993: 122). Lacaille (1954: 159) doubted that the mesolithic tool kit was substantial enough to manufacture log boats, but the possible use of antler and fire suggests that this argument is misplaced: experimental work at Archaeolink themepark demonstrates that log-boats can be built without substantial stone-tools. Mesolithic log-boats are known from Scandinavia and Ireland. However, temperate wood tends to float very high in the water and is rather unstable at sea (B Finlayson, pers. comm.), log boats are more suited to sheltered rivers and estuaries (Gregory 1998). This is very interesting given the apparent significance of rivers and estuaries to mesolithic settlement. In any case skin- or bark-covered boats are very seaworthy and were almost certainly manufactured in the period. Mesolithic people probably had a range of technologies to choose from depending on particular circumstances.

Environmental data is also of great importance, and can be crudely divided into two types: reconstructions of the environment itself (see **5**) and the analysis of macrofossils from archaeological assemblages. Unfortunately there are taphonomic difficulties with the destruction of many macrofossils in wood fires; hazelnuts char rather than carbonise and therefore dominate the plant assemblage. No assemblage comparable to the remarkable concentrations of material at Staosnaig, Colonsay (Mithen ed. forthcoming) has been found in the east although an oak-dominated charcoal assemblage from Nethermills does shed some light on patterns of wood gathering (Boyd & Kenworthy 1992). As standards of excavation and sampling progress it is to be hoped that the study of macrofossils will provide more information on mesolithic lifestyles.

2.2.3: Comparisons

Before discussing the types of site that these materials are found upon it is necessary to compare the eastern Scottish data-set to other northwest European assemblages. One absence is organics such as wood or leather, sometimes recovered on wetland excavations. These survive poorly in Scotland's acid soils, although antler tools from Blair Drummond and Meiklewood were partly hafted when found in carse clay deposits (Smith 1989: 281). A dramatic difference is the absence of burials, an important feature of the mesolithic in parts of Europe. These are often located near coasts or rivers, on dry slopes above or near lithic scatters. The only mesolithic human remains known in Scotland are the enigmatic finds of small bones from middens on the west coast (Pollard 1996 for discussion). Their absence from other areas may reflect acid soils, as well as traditions of excavation and research, which have often focused on lithic scatters themselves, to the exclusion of other activity in the area. However, it should also be noted that the samples of the landscape generated through developer funded archaeology and through the long-term urbanisation of estuarine and riparian environments have not recovered any evidence of mesolithic burials (of course, much evidence may have gone un-noted). At present there are no known mesolithic burials in eastern Scotland and our interpretations must be made without reference to such phenomena.

There is little evidence in eastern Scotland for mesolithic art. Mithen's European review (1994) highlights a range of material: Azilian painted pebbles, elaborate decoration on paddles at Tybrind Vig, carved antler and bone, and rock art of the Spanish Levant. It would be inappropriate to try and identify a separate 'artistic' sphere of mesolithic life, since these artefacts remind us of the ways in which the routine and symbolic were closely interwoven. In eastern Scotland, aside from hints of the importance of ochre, or pigment, and some possible perforated shells, there is no evidence for this kind of elaboration although this may be due to conditions of preservation.

2.3: Sites and combinations

Although many artefacts are found in isolation it is not uncommon to find combinations of artefacts with structural evidence. This evidence varies widely and can be divided into two simple categories for convenience: first, sites with structural features such as post holes, scoops and hearths, often interpreted as 'camp-sites' of differing types; second, shell middens (of course, structures are found within shell middens).

2.3.1: Structures

In Britain Mesolithic sites are generally characterised by negative features and stone constructions of varying type. Exceptions do exist, for example substantial revetted timber and brush platforms dating to *c.* 5500 BP at Eskmeals, Cumbria (Bonsall *et al.* 1989) and turf structures at Ben Lawers, Perthshire (Atkinson *et al.* 1997), and future research may identify more diversity, but the present database is dominated by fairly ephemeral features.

In part this ephemeral character reflects structures with small stake- and post-holes, but complex soil formation processes have had an important influence (Davidson & Carter 1997). At Balfarg Henge the excavator noted that it was very difficult to identify some neolithic features because soil processes were transforming anthropogenic features into natural soil (Mercer 1981) and these processes are likely to have been even more significant on mesolithic sites. The formation and character of Scotland's soils is a Holocene phenomenon, making natural soils (maximum age *c.*10,000 radiocarbon years) difficult to distinguish from mesolithic anthropogenic features. Furthermore many sites are found on light well-drained soils and have often suffered from mole and rabbit infestation, *e.g.* Morton (J Coles 1971) and Manor Bridge (**App 2.3**). Given the insubstantial character of negative features animal damage can be extensive. Worms can also move artefacts significantly and remove traces of postholes (Wickham-Jones & Dalland 1998). The evidence from Nethermills is relatively substantial in terms of the eastern data, yet difficulties in identifying sub-soil features were noted (Kenworthy 1981). Where negative features are identified they often take the form of small post-holes or shallow scoops and hearths such as those known at Morton (J Coles 1971). Here windbreaks and other light structural features can be postulated (Figure 9). The volcanic rock bank appears to have been utilised as part of these shelters, and it is possible that the bank was modified for shelter (1971: 329).

Pits are discussed in more detail in **8.6** and are common on many sites. On the west coast, mesolithic sites are often associated with low scoops, either natural, anthropogenic or a combination of the two. At Low Clone for example occupation took place in a low scoop on a cliff edge (Cormack & Coles 1970) and at Staosnaig large scoops have been interpreted as house footings. One possible feature of this type has been identified at Forvie (**7.3**). Such features hint at the importance of more substantial structures than are commonly recognised and it is salutary to note that the site at Newton, Islay was recognisable as a crop mark after excavation (Wickham-Jones forthcoming a). Aerial photography has not featured highly as a prospection technique for mesolithic sites and some at least of the irregular features that form a large part of this record may be mesolithic in date. It is also interesting that mesolithic features at Staosnaig, Colonsay were substantial enough to be identified in geophysical survey (Mithen &Lake 1996: 140).

A range of other features are also found on mesolithic sites, from low cobbled areas through to stone set hearths. These are often interpreted in terms of light wooden and hide structures (Figure 10, 11). Many reconstructions draw very heavily on ethnographic parallels, and are sometimes all too readily accepted (Wickham-Jones forthcoming a).

2.3.2: Shell middens

Middens form one of the most important sources of information on mesolithic lifestyles. In many cases, because of the strong association between the study of shell middens and gatherer-hunter archaeology it has been assumed that middens are necessarily of mesolithic date (Sloan 1993: 14). However, middens are a feature of many periods and history, and may not fall comfortably into our fixed chronological categories. Some middens are located with respect to the highest post-glacial shoreline, and are therefore assumed to be contemporary with this feature although these associations are not always clear. For example a midden at the Bay of Nigg, Aberdeen, was located on the '25-foot' raised beach and is recorded as a 'mesolithic' midden although its date is actually unknown (NMR NJ90SE 8). Seven middens have returned radiocarbon dates, and 5 predate *c.* 5000 BP (Figures 12, 13, 14); many other middens may also be early. The present day survival of middens is greatly affected by relative sea level change (see below). Furthermore, if not conspicuously mounded, middens can be very difficult to locate (Sloan 1993). Our understanding of their character or extent is very limited.

The midden at Morton B rested directly on beach deposits of the Main Postglacial Shoreline just to the side of the low island/outcrop. It was c30m long, c3.5m wide with a maximum depth of 0.78m (J Coles 1971: 341ff). Its composition varied, but included clear weathering horizons, evidence of discontinuous use. One area may have been levelled; small stone-set hearths and post-holes and two low arcs of stone (which may have formed a circle) were noted. Assemblages of stone- and bone-tools include 38 bevel-ended bone tools (see above) and 372 lithics, dominated by heavy forms with bipolar traditions present (Clarke & Wickham-Jones 1988). The site is presumably closely associated with later mesolithic material from the adjacent Morton A although this cannot be conclusively established and important differences in materials and technology can be observed between the two areas (7.6). Shellfish, fish, birds, mammals and plant remains were found, indicating widespread and varied exploitation of regional resources (J Coles 1971, 1983). Many of the birds nest on rocky cliffs found only 1.5km away whereas cod bones may indicate fishing beyond the immediate infralittoral zone (J Coles 1971: 353). The presence of a 3m long sturgeon either reflects adventurous fishing, or the exploitation of a stranded fish. Shellfish remains were very varied: cockles dominate, but Baltic tellin, *Venus striatula*, mussel and claws of the edible crab were widespread. The species reflect a variety of habitats, but mainly shore collection. The small assemblage of plants are all possible foodstuffs (Figure 15). J Coles (1983: 12) notes the absence of seal, dolphin, porpoise or whale remains.

Morton is not typical of all eastern middens, for many are estuarine and dominated by the remains of a single species – oyster (*Ostrea edulis*) – and in the areas excavated include no evidence for fishing. This is characteristic of middens in the inner Forth Estuary and possibly of those in the Moray Firth (sites in Inverness and near Elgin) as well as northwest Europe more widely (Sloan 1993). The Forth sites are complex features, which appear to have been used in both the mesolithic and neolithic. Nether Kinneil, for example, was a large prominent mound, the full extent of which is not known (Sloan 1993). Alongside charcoal concentrations it included a wide range of structural evidence; in the east, a possible living floor with charcoal, sand layers, stone hearths and structural stone setting; in the centre, a complex series of features are superimposed. This begins with a bank of clay, soil and rock erected at the base of the midden (which rests on bedrock) possibly as a barrier against high tides (ibid. 85) and continues through midden deposits and revetment of the midden itself. A range of artefacts includes 27 pot sherds, 3 flints, 1 quartz, some spalls and hammers and pounders, a single bone pin and some worked shell. No bird or fish bone was recovered, but over one hundred fragmentary pieces of animal bone were present. Much of this activity dates to the neolithic period.

Similar complex sequences are recorded at Inveravon (MacKie 1972) and other examples include Polmonthill (NS97NW6). This was at least 170 yds in length, 25 wide and 3-4 high. Lacaille (1954, 168) stated that it mainly contained very large oyster shells, with occasional mussel, cockle, periwinkle and whelk. A midden discovered in 1870 on Inchkeith Island in the middle of the Forth estaury, included bones of sheep, pig, cow, horse, rabbit, and seal as well as bevel-ended tools (Lacaille 1954). The midden cannot now be identified, and has been dismissed as non-mesolithic because of the appearance of domesticated animal bones. However, the dates for these Forth middens do not sit comfortably in rigid chronological categories, and the Inchkeith midden may therefore be broadly comparable to these other features, some of which are, in part, mesolithic. Sloan's surveys identified a large number of possible middens of various sizes in the Forth in the area of Inveravon, Polmonthill and Nether Kinneil. These hint at a network of sites.

One theme of recent analyses of middens has been the investigation of seasonality. Deith (1983, 1986) utilised growth line analysis on samples from Morton to demonstrate that the majority of material was collected in the winter, but with sporadic summer activity as well as small-scale activity in late summer/autumn. Using isotopic evidence Deith also demonstrated that the entire range of the shore was exploited rather than focusing exclusively on the best areas for cockles that would have been obtainable at especially low tides (1986: 75). Deith therefore argued that shellfishing was an embedded activity, subordinate to the collection of raw materials for stone tool production.

Where middens have been excavated two types of deposits can be identified: dumps of shell, and occupation surfaces (see Morton, above and Muirtown, **6.3.2**) and this often seems coherent with episodic patterns of use. However Sloan has argued that the Forth middens form part of a system of 'sedentary hunter-gatherers' (1993: 383) and it is clear that much work is still required on these sites, not least to unpick chronological variation. In general small-scale sporadic use seems consistent with the bulk of our evidence.

One key debate has been the relationship between midden sites and microlithic assemblages (*e.g.* Bonsall 1996). In recent years it has become clear that there is no absolute categorical distinction between middens and microliths in the west. In the east few middens have returned microlithic associations although this may reflect the particular middens that have been excavated. A single microlith is known from Morton B, but, given the complex history of use and reuse of this site it would be easy to make too much of this artefact. In any case, the proximity of Morton A and B suggests that a distinction between a microlithic 'site' and a non-microlithic 'midden' would be meaningless, although, of course, different activities may have taken place in these locations. More recently, midden material was uncovered in association with microlithic material at Milton of Culloden, Inverness (NH74NW 81) although the exact relationship between the two classes of evidence is not clear (J Wordsworth pers. com.). It is difficult to assess this limited range of data, but it seems unlikely that a categorical distinction between middens and chipped stone is appropriate. The Forth middens are anomalous in this sense, as in so many others.

Many factors complicate dating of middens (Figure 14, 15). Notwithstanding the difficulties of dating shell,[19] the stratigraphy of midden sites can be very difficult to interpret. At Nether Kinneil for example, midden material had slumped from up-slope, completely inverting the stratigraphy (Sloan 1993). It therefore seems likely that the earliest deposits here were not sampled. Further problems are evident in recent dates from Morton - where the carbon dates associated with the midden are 6000 BP, whereas that from a bone tool is closer to 5100 BP (**2.2.2**). Some Forth middens have returned no dates earlier than 4000 cal BC; Nether Kinneil for example dates from *c.* 3250 cal BC to 2250 cal BC. It is noteworthy that the distinctive complex features within the midden reviewed above are later than the adoption of agriculture in the region. The single date from a sample of material from Cadger's Brae is also 'neolithic' and the dates from Mumrills and Braehead are late in the mesolithic. Dates from the base of the midden at Inveravon calibrate into the fifth millennium cal BC, broadly contemporary with Muirtown. Morton is the oldest dated midden, falling broadly into the period 5250-4750 cal BC although it is clearly in use later.

It is difficult to assess these data. Ashmore and Hall (1992) argue that two phases of midden use can be identified in the Forth: Late Mesolithic and from *c.* 3250-2250 cal BC. The Forth middens are very late in the mesolithic, and it is not clear that this type of single species midden is representative of the late mesolithic in eastern Scotland as a whole. The potential loss of many middens through the processes of sea-level rise and fall (**2.5.5**) makes it difficult to appraise the relative importance of these phenomena throughout the mesolithic

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[19] The dates presented in Figure 3.12 have been adjusted to compensate for the marine reservoir effect.

period. The seeming significance of middens towards the end of the period may be a product of preservation.

Middens provide a powerful, if rather enigmatic source of data on gatherer-hunter lives. Our understanding of their distribution, uses and chronology in eastern Scotland is shaky. It is also significant that middens have often been treated by archaeologists as a pool of environmental data: a guide to what people ate and when they killed it. Despite the wealth of information recovered by these analyses this stress is somewhat unfortunate because by focusing on the content of a midden, we have forgotten to ask how it was constructed or how middens were integrated into the processes of social reproduction in the past (Pollard 1996 is one exception). It may be especially significant that many middens do not sit comfortably into our rigid chronological categories. The Forth middens are difficult to interpret, but indicate real complexity in the 'transitional' period, and a midden from Stannergate, Dundee with some 'mesolithic' affinities also includes a polished andesite tuff axe (NMR: NO43SW 20, Lacaille 1954: 176). At this stage the processes responsible for these phenomena do not allow of interpretation, but may form an important focus for future research.

2.4: Data distribution

The creation of a distribution map is an expected aspect of research of this type, especially for demonstrating the archaeological wealth of a rather neglected subject. However many factors militate against establishing a comprehensive distribution map for mesolithic material across eastern Scotland and these must be outlined even before potential biasing factors are highlighted. Biases are pervasive and such a map is only of use at the very broadest of scales.

Most of the database is comprised of stone tools held in varied locations across Scotland. Many of these assemblages are now included in the invaluable Lithic Scatters Project Database (henceforth LSP, *e.g.* Barrowman & Stuart 1997), information from which was donated to me in an incomplete form at an early stage of both research programmes. The LSP involved the collation of varied data from museum catalogues, national agencies, local collectors, regional archaeologists, journals, units and other researchers in order to establish a national record of surface lithics. Two themes are important. Firstly any synthetic database is reliant on the quality of the material it is based on, and Barrowman and Stuart properly decided to maintain the 'process of categorisation and decision making' (1997: 19) used by those contacted. In many instances these attributions of date are made on what may now seem questionable grounds. Secondly, it is also important to note that when donated to me the LSP catalogue was incomplete, not least because of the failure of many correspondents to respond (especially commercial units). Many private individuals retain collections that are not part of the archaeological sphere in any way. As a consequence it is not possible to state how many mesolithic sites there are in the region as a whole. Without working through every collection, in every museum and many private homes, it is impossible to systematically address these concerns. I decided, at an early stage in my research, that this would not be an appropriate use of my time as it was more important to assess the characteristics of the data available to us and the potentials of this material. Two maps of the distribution of material in the Tweed valley illustrate that this does not seriously prejudice our understanding of the character of settlement. Figure 16 illustrates all supposed mesolithic sites in the Tweed, based on a variety of sources. Figure 17 illustrates all sites from which I have seen microliths (Figure 18, with the caveat that no exhaustive search has been undertaken). There are no meaningful distinctions between the maps in terms of the character or extent of settlement.

Assessing the date of a site is vital. In the case of the information from the LSP I have accepted it as given, unless I know it to be in error. There is inevitably therefore an element of doubt in some instances. In other instances, such as the collections of Knox, and Kenney's work, I have included sites in this database *only* if they are either carbon-dated to the mesolithic period or include microliths. There are difficulties with the use of this system of classification (**2.2.1.4**). In particular the use of this rigorous system of classification means that many sites in the Upper Tweed and Dee including blade-core industries that I believe to be mesolithic are not included. The difficulties of dating middens have already been highlighted (**2.3.2**). Middens are included in the distribution map where carbon dated to the mesolithic period, or where often discussed in relation to the mesolithic period and effectively treated as part of the archaeological reality of that period. This unfortunate situation is an inevitable outcome of the ways in which our understandings of the period are constructed. The use of this broad range of data also requires a series of decisions to be made about accuracy. Many antiquarian assemblages are identified only to the level of a place name, sometimes with a four-figure grid reference. Yet at the broad scale these artefacts can still provide useful information about the extent of mesolithic activity, and they are included here.

I have added extra sites to the LSP database, for example those discussed by Kenney (1993), or identified by my research. Excavated sites and middens have also been added. For some important surveys, such as those carried out by Reading University near Clava grid references are not available at the time of writing (Bradley 2000b).

The database at present includes 230 references and the map (Figures 19, 20) offers a coarse picture of the distribution of archaeological material in the present. In comparison with Figure 21, the overall distribution of surface finds generated from LSP data, several features are notable. Firstly the distribution is patchy with notable foci, such as the central Tweed valley, secondly, rivers appear to provide an important focus. There is little sign of activity in the uplands but this is true of all surface finds. The relationship of this understanding of the distribution of archaeological material to those that may have existed in the past is not clear and it is necessary to examine a range of biasing factors.

2.5: Biases

> 'It is simply unclear to what extent the distribution of Mesolithic sites in the landscape reflect past settlement patterns rather than being simply a function of modern farming practice and archaeological activity.' (Mithen and Lake 1996: 125)

The material culture of the mesolithic period is subjected to a range of processes that inevitably bias our understanding of the character or extent of that material. Biases include the activities of local collectors, modern population centres, commercial factors, sea-level change, river processes and a series of post-depositional factors. Before discussing these in more depth it must be noted that the influence of biases in understanding the distribution of mesolithic archaeology is severe. Spikins argues that in northern England

> '... the influence of biases is pervasive. The effects of bias on the distribution of sites are much more far-reaching than we might expect and mean that interpretations drawing on site distributions have little firm footing. Even interpretations based on the composition of assemblages, rather than simply on the distribution of sites are affected by many different biases. ... the mechanisms of bias are extremely complex ... it may not be possible to simply identify biases and account for them' (Spikins 1999)

Notwithstanding the difficulty of identifying potential biases it is problematic to accurately assess the *particular* influence of these factors in a given area. Many biasing processes are large-scale phenomena, such as climatic change or sea-level rise, but these actually affect our perception of material at the *local* level and it is not always possible to identify in advance the extent to which these problems may have influenced a particular situation (see below). It is therefore not possible to identify at any meaningful level the extent of national bias: *processes* may be identified but not quantified. I have therefore made no attempt to systematically analyse the effect of bias across the study area as a whole. Such analyses would only be appropriate at the level of the intensive regional case study. Here I discuss important themes that shape our archaeological reality.

2.5.1: Non-institutional archaeologists

One of the most characteristic features of mesolithic archaeology is the importance of local archaeologists and archaeology groups. Because of the primacy of stone tools as data non-institutional archaeologists[20] have made considerable contributions to enlarging the

[20] In this discussion I use the label 'non-institutional archaeologists' to describe these varied groups of people. I hope that this label is relatively neutral, rather than categorising people who make substantial contributions to our knowledge as collectors or enthusiasts.

distribution of archaeological material in the landscape. Lithics are important in other periods of prehistory, and artefact collections can also contribute to these periods as well, but in no other archaeological study are the activities of collection so central to the interpretation of the ancient landscape. This in turn means that the relationship between these groups and the profession is of some importance,

Many non-institutional archaeologists are interested in collaboration with professional archaeologists. Mr Knox donated his collections from the Peebles region to me as one aspect of this research. These transform our understanding of the area (**App. 1**): Mulholland's review (1970) discussed only four sites in the Eddleston valley, and did not identify any sites on the Tweed west of Ashiestiel, approximately 12 miles downstream of Peebles. Mr Knox has identified 57 find spots in this area, including 6 mesolithic sites, 5 further sites that include mesolithic material in mixed assemblages and 7 possible mesolithic sites[21] (Figures 23-25). Individuals with institutional positions have also been instrumental in establishing local bodies and the work carried out by these groups is often of considerable importance. The Biggar Museum Trust has frequently combined field survey, test pits and small-scale excavation to advance our understanding of their region. The discovery of important assemblages from Daer is only one example of their work (Ward 1995 and more recent discoveries).

However, not all relationships are good.[22] Some non-institutional archaeologists feel that professional bodies have failed to live up to promises, or that they have simply taken over projects with little regard for the groups in question. In a number of instances organisations have failed to give anything back to the local communities concerned, a situation of some concern given the increasing economic (and social) divide between the cities where most institutionalised archaeology is based and the rural or semi-rural location of most fieldwork.

An important factor about non-institutional archaeologists is that they often recover different types of site than traditional fieldwork campaigns. The distinctions between non-institutional archaeologists examining their local area and institutional archaeologists who *visit* areas can best be understood as reflecting different types of archaeological attention to the landscape. The identification of a site involves the recognition of a meaningful concentration of material against general archaeological 'background noise'. In the context of the short visits

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[21] Narrow blade core dominated industries but without any diagnostic artefacts.
[22] Politics dictate that these individuals and groups shall remain nameless.

undertaken in most institutional fieldwork this is dependent on a meaningful sample of lithic material being visible at any one time. In most instances this limits survey to areas of ploughed land (see below). In contrast, Knox identified sites from small-scale erosive contexts. For example the sites at the Dookits and Manor Bridge were discovered during repeated visits whilst Knox walked his dog along the Tweed-side path. At any one time the number of artefacts visible, in molehills or on the path, was small but *over a long period of time* an important assemblage has been collected. Test pit survey has demonstrated that the site includes structural evidence as well as macrofossils and lithics (**App 2.3**). I have visited the sites many times: on no single visit have a large number of artefacts been visible, never enough to suggest that the site was of the importance that it has been demonstrated to have. The recognition of the site has been entirely dependent on Knox's repeated visits, a kind of archaeological observation that is impossible within the context of institutional fieldwork. Non-institutional archaeologists sometimes identify sites in areas where traditional fieldwork is less likely to investigate. For example Knox identified a number of sites in erosive contexts in the hills, an area where, unless a substantial, labour intensive and expensive test pit campaign was instituted (Bang-Andersen 1987), institutional archaeology would be unlikely to examine. Kenney (1993: 219) highlights similar problems in her attempt to locate some of the sites identified by the late Derek Milne during his fishing visits to the upper Dee.

Difficulties also surround the identification of sites through fieldwalking, where one visit is often insufficient to locate meaningful samples. The importance of conditions in fieldwalking also militates against the effectiveness of single visits. Ideal fieldwalking conditions include a mixture of surface weathering, light and weather, and without long-term access to an area it is difficult to optimise these variables. Furthermore in many areas fieldwalking opportunities are limited. In upland areas long-cycle plough regimes mean that there is only one chance every 7 years to examine a field, whilst in intensive arable cropping areas with rapid rotations there are often only a few days when fieldwalking is possible. Recently a scatter identified in arable ploughing at Brownsbank Farm, Biggar, was excavated by the Biggar Museum Trust within two days of its discovery because the field was due to be rotavated two days later, a process that would have severely compromised the archaeological material (Ward 2000). The key is that if you do not habitually pass through the landscape many opportunities to identify sites or blank areas will be missed. This kind of engagement is not possible during short visits and is vital to the understanding of the mesolithic landscape.

The differences between the kinds of archaeological attentiveness associated with the local and the visitor are important but can work as a strength if combined. Local perspectives can and should feed into structured research campaigns. Much of my research in the Borders has been of this type. However it is important to note that despite the importance of local bodies (in every sense!) to mesolithic archaeology there are problems. Notwithstanding the difficulties of finding out about some collections, or of material being poorly recorded, the popularity of collection can lead to the creation of massive backlogs of unstudied artefacts. Local organisations often do not have the expertise or time to process this material. As a consequence material remains of the mesolithic period reside in boxes on shelves: preserved from the plough, but hardly contributing to our understanding of the period.

The activities of non-institutional archaeologists are fundamental to our understandings of the extent of mesolithic activity in the landscape and collaboration with these groups is essential. The ease with which individuals can transform our understandings of a region reminds us that our understandings of the landscape will always remain incomplete. Focused medium-scale programmes of research are essential to the future of mesolithic archaeology in eastern and upland Scotland. Such programmes of research must incorporate the long-term attentive perception of the residents of the area, and must be prepared to give them something back in return for it.

2.5.2: Modern centres of population, developer funded archaeology

The influence of centres of population on the distribution of archaeological material in the modern landscape is pervasive. Towns provide bases from which non-institutional archaeologists operate, especially in the context of smaller country towns such as Biggar, Peebles, Selkirk and Galashiels. For over a century this has had an important, if unquantifiable, influence on the number of sites known in an area and the representativeness of the material left in the ground. Urban centres are also often built in locations that have long been attractive for human settlement, especially estuaries and river junctions. Although this leads to the obliteration of sites it can also provide occasional snapshots of material: mesolithic finds or sites are known in Inverness, Peterhead, Bridge of Don, Aberdeen, Dundee and Edinburgh to name but few.

Sometimes mesolithic sites are discovered during development of urban areas. However the demands of mesolithic archaeology are specific and methodologies designed to deal with archaeology of other periods may not be appropriate for mesolithic material. It is certainly possible that mesolithic sites have been missed because of inappropriate methodologies, and it is very likely that the recovery of material from sites has been prejudiced (see **2.1.1**).

Developer funded projects provide another bias, as the distribution of these sites is a product of commercial factors. At one level it appears that these factors are 'random' in the sense that they are unlikely to replicate the expectations either of archaeologists, or the principles underlying the choice of locations for settlement in the past. As such these sites appear to provide a random sample of the ancient landscape. However archaeological expectations structure archaeological assessments and therefore the character of the response considered necessary. There is therefore inevitably a circularity in our responses to the threats to different areas of the landscape and the 'random' character of developer funded archaeology is circumscribed by our expectations of where protective action might be necessary. Given the poor character of our understanding of the character and extent of mesolithic archaeology in the east this situation is of real concern as it is possible that we are systematically misinterpreting, and therefore mismanaging, these landscapes.

This is clearly indicated by examining forest planting: 'the planting of private and state forests over the last half century has radically altered the landscape of Scotland' (Turnock 1982: 246) (Figure 26). The majority of afforestation has been in the Highlands although other areas, especially Grampian and the southwest have been significantly affected (Turnock 1982: 250). Afforestation offers a series of archaeological potentials and problems. Forestry ploughing represents one of the few contexts in which large upland areas can be examined and the success of recent exercises at Biggar Common (Johnston 1997) demonstrate clearly the gains that might be made from an examination of these areas. However ploughing is extremely destructive, and only in recent years has routine archaeological survey taken place. Even then, pre-afforestation survey has tended to search for upstanding monuments and there has been little systematic attention paid to the potentials of post-ploughing fieldwalking to recover lithic assemblages. Unfortunately changes in technology are reducing the need to open large furrows, and therefore minimising the opportunity to recover archaeological information.

2.5.3: River valleys

The majority of our evidence for mesolithic settlement in the east comes from ploughsoil contexts in river valleys. Collections from beneath sand dune systems are important, and can often be very large but in terms of a sample of the mesolithic landscape they are less significant than those artefacts recovered inland. Of course, the reliance on ploughsoil recovery immediately creates a significant bias to the distribution of archaeological materials. The location of ploughed land is determined in part by commercial factors: most arable is often in the bottom of river valleys or wider coastal plains, whilst most improved pasture is higher in valley systems.

Differing agricultural regimes offer different opportunities for analysis (see above) and have been implicated to varying degrees in the post-depositional transformation of the material within the ploughsoil. In some areas of the eastern lowlands improvements began over 250 years ago (Devine 1999) and ever since, the ongoing destruction and movement of archaeological material has continued. Recent developments in intensive farming, including the use of the rotavator are increasing the speed of destruction of the record (T Ward, pers. comm.). The location of mesolithic sites within high quality agricultural land is therefore a mixed blessing: historically it will have increased the chances of the site being identified but will also have contributed significantly to the likely destruction of this site. In these areas we are able to discuss a range of lithic evidence, but often with little or no reference to other surviving features. Survivals of structural evidence from these areas, such as Nethermills, are therefore of considerable importance to our interpretation of mesolithic landscapes. In places the extent of soil movement associated with agriculture is extensive. Desk-top analyses and small-scale survey work carried out as part of this research intending to identify mesolithic settlement in the Lunan Valley were abandoned because lynchets visible on hillsides and extensive localised colluvial deposits identified in the valley bottoms made survey a fruitless task (**App. 4**).

Away from the valley bottoms itself the presence of extensive peat cover creates a further bias to the distribution of archaeological material. The timing of the onset of peat coverage is controversial (see **4.1.5**). In places such as Carn Dubh (Tipping 1995) it was initiated during the mesolithic period but the large-scale phenomenon post-dates that period, and therefore covers many areas of the mesolithic landscape. Whilst blanket peat covers some 1.1 million hectares of the Scottish landscape (C Flitcroft, pers. comm.) the distribution of peat is not even and severely limits our ability to understand upland landscapes. In the Pennines and the

North York Moors erosive peat contexts have been important find spots for mesolithic artefacts creating a significant bias to the distribution of material (Spikins 1999). Spikins outlines potential influences on peat erosion in England, one of the most significant of which is the presence of major industrial cities. Industrial pollutants, both gaseous and particulate, increased demand for upland sheep grazing, popular footpaths and the activities of collectors are important factors in determining the location and intensity of erosion. This complex suite of factors precludes any simple translation to the Scottish context, although the low density of population in Scotland outside of the Central Belt in comparison to northern England should be noted. In Scotland forestry ploughing (see above) is the most significant influence on upland land use.

In summary these factors all suggest that our glimpses of mesolithic landscapes are inevitably biased towards agricultural or riverine contexts. However it is important to note that large areas of very high quality arable land, such as the Lothians or the Merse have little or no record of mesolithic occupation despite including population centres, and in some cases, active local archaeology groups. The rarity of surface finds near Edinburgh, for example, is surprising, especially given the presence of many middens (Sloan 1993) and mesolithic artefacts from Crammond (Dean 2000) and the Meadows, Edinburgh (LSP). It appears that some, at least, of the importance of certain river valleys to our modern distribution may reflect prehistoric choice (4).

2.5.4: River processes

River systems are inherently dynamic (Brown 1997b) and given that many of Scotland's valleys contained large amounts of easily reworked glacially derived sediment, river profiles have changed considerably during the Holocene. The complex geomorphic history of rivers and their associated landforms is still poorly understood, especially in the Uplands (Tipping 1994a: 333) but they can be such powerful agents of landscape change that some consideration of their impact is essential. Howard and Macklin's recent review (1999) outlines archaeological preservation issues for high-energy river systems with non-cohesive channel banks, characteristic of upland Scotland (ibid. Table 1).

- preservation potential highest on older terraces, may involve multi-period remains
- narrow valley floors prevent long-term terrace preservation
- high magnitude floods flush sediment fills from valleys
- incision reworks archaeological remains

- incision results in a lowered water table and dessication of archaeological and environmental remains
- aggradation buries features
- alluvial fans from tributary streams contain reworked material and bury other material
- movement and colluviation result in slope erosion and burial of terraces
- organic material may be preserved in palaeochannels or mires.

They list the same factors for medium-energy river systems with non-cohesive banks, including those of areas such as the Southern Uplands, highlighting that the wider valleys may allow the preservation of older terrace units despite channel mobility. River systems, because of their importance to settlement of all periods have often been extensively managed and transformed, especially in recent centuries. Drainage and embankment also have important consequences for interpretations of river systems.

These concerns may all be pertinent in any given landscape, but it is only by detailed examinations of an area that it will be possible to assess the significance of these processes. For example, despite a regional phenomenon of 'major later prehistoric fluvial deposition' (Tipping 1994b: 653) in the Cheviots, a large-scale episode in the Upper Bowmont at *c.* AD 1700 entirely flushed-out valley sediments, and the present day valley-floor is the outcome of episodic landscape formation since that date: 'with the exception of a few high-level terrace and fan fragments, the river has completely removed all traces of deposits older than approximately 1670-1770 AD' (ibid. 651). The Upper Bowmont highlights both the extent of landscape change and also the importance of local factors in landscape formation – regional models are of use but are not applicable in every situation. Changes in river profiles can have important implications for our understanding of the chronology and character of settlement in a valley system. This is especially true in upland areas, where survey must often take the labour intensive form of test pits (Bang-Andersen 1987). In these situations it is important to understand the chronology of landscape formation in order to manage the survey effectively as well as interpret the results. This requires a battery of investigative techniques and an integrated approach to test pit survey and landscape history formed the basis of the survey of the Burn of Calleter carried out in 1999-2000 and described below

2.5.4.1: Excavations at Rink Farm

The complexities of river and geomorphic processes for mesolithic archaeology in Scottish river valleys are demonstrated by recent excavations at Rink Farm, at the junction of the River Tweed and Ettrick Water (**App. 2.4**; Figures 27-47; *c.* NT4832). Rink is one of the most productive Tweed valley scatters and has been collected from for many years, with huge collections of varied artefact types known (Mason 1931; Lacaille 1954; Mulholland 1970; Haley 1990). Mulholland, working in conjunction with Walter Elliot, [23] discussed nine artefact concentrations, 'each of which covers an area of 20 to 30 square yards' (1970: 81), two of which come from the foot of the bank on the lowest terrace fragment (Field A, Figure 30). In his geomorphic history of the Tweed Valley Rhind also discusses the artefacts from the lowest terrace. He argues that the artefacts are *in situ* (1968: 152) and that therefore the terrace itself must predate the mesolithic period.[24] Therefore, 'the floodplain has long been about its present location. Thus it seems reasonable to suggest that ... the river gradually obtained its present level during and shortly after the dissolution of the glaciers. It is likely that since this period the vertical variations in river profile have been small, terrace formation being much restricted in comparison with that in Late-Glacial times.' (ibid. 24). Rhind therefore advocates a high level of stability in the Tweed during the Holocene but this has been questioned (R Tipping, pers. comm.). Mulholland's, Rhind's and Elliot's comments about finds from Field A are contradicted by earlier statements about the location of finds. Lacaille notes that Rink is of interest because of its position on a raised knoll, unlike many other mesolithic sites in the valley which 'as a rule ... have been found on the low ground near the rivers (Lacaille 1954: 163), whilst Mason (1931) states that no finds come from haugh[25] lands beneath the ridges.

Finds from low down by the river are on other Tweed Valley sites; for example many finds from Dryburgh Mains are from extensive haughs (Callander 1927; **App. 3.1.4**, Figure 67). The terrace system at Dryburgh is very complex, 'the Dryburgh meander core exhibits terrace remnants which are markedly askew to one another, each one cutting one, two or more higher terraces, this implies continuous shifts of river orientation' (Rhind 1968: 139). It is difficult to date these features and the meander core itself refers to the area immediately to the east at the Abbey, but this suggests that some critical attention must be paid to the geomorphic context of these artefacts. At Springwood Park, Kelso, near the junction of the Teviot and Tweed (**App 3.1.1**, Figure 67) other problems are evident: the main concentration is from a field on gentle slopes above the river, overlooking the racecourse, and separated from the floodplains by steep banks that incorporate a spring. Mulholland (1970: 81) states that 'material is collected on the entire slope, including the foot, of a steep bank but not in the valley bottom immediately adjacent to the bank; this would suggest a considerable

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[23] A non-institutional archaeologist based in Selkirk who has collected artefact from Rink for many years and knows the sites intimately.
[24] Although his date for the artefacts of older than 4-5000 years is wrong.

accumulation of material subsequent to post-Mesolithic erosion'. This is suggestive of a high field being cut by an eroding river, pulling material down-slope; changes in river profile and hydraulics may then have led to sediment deposition covering the artefacts at the base of the slope.

The geomorphic context of these varied sites is of considerable importance. I therefore decided to undertake trial excavations at Rink in June of 1999, in order to appraise the geomorphic context of the artefacts on the lowest terraces and contribute to wider models for the relationship of archaeological material to river processes in the Tweed. The location of the trenches was determined by field advice from Walter Elliot on the area of finds and Rhind's comment that 'geomorphologically the most significant is a group found at (NT)48853230 on the rim of the lowest terrace fragment (F.414)' (Rhind 1968: 152). Two trenches (T1, T2) were excavated in this corner of F.414 (Figure 33) and one trench (T3) in the large terrace immediately to the west, an area that Elliot claims produces 'neolithic' artefacts (although it is not clear what artefacts he refers to) (Figure 34). According to the farmer, Mr Bayne, the extreme west of F.414 (where the excavations took place; Figure 35) is uniquely stony in comparison to the rest of the field and the least likely to be flooded.

Both trenches on F.414 recorded similar profiles (Figures 37-39). The basal layers were dominated by large glacio-fluvial gravels incorporating very frequent and very large clasts, the size of which is very suggestive of deposition in a glacial or immediately periglacial context; they seem likely to be Late Devensian. These were overlain by varied smaller glacio-fluvial deposits, possibly of Younger Dryas date (R Tipping pers. comm). There appears to be a break in the depositional record before a series of fine coarsening-up sequences, characteristic of the later Holocene, are deposited in slight channels in the Dryas gravels.

An interpretation of this sequence is that a terrace fragment existed in this location from the Lateglacial. This was overlain by Younger Dryas episodes of accumulation, then there is a hiatus in our record before the deposition of late Holocene material in channels in the Dryas gravels. Any early Holocene land surface that had existed above the Younger Dryas material may have been scoured out by processes of channel formation in this area, and the lowest terraces in the area have a wide range of dry channels cutting across them. This implies that any mesolithic land surfaces have been removed. Characteristic mesolithic stone tools were

[25] 'Haugh' lands refer to the floodplain

recovered from plough soil and from a colluvial deposit in Tr2, which appears to have derived from terraces immediately up slope, presumably in conjunction with road building or agricultural practices. It is interesting to reconsider Mason's comments that no artefacts were found in the lower terrace at the start of this century.

Excavations at Rink have therefore demonstrated that the artefacts found on F.414 are not *in situ* and therefore do not provide a relative date for that terrace. But a terrace fragment *did* exist in this location during the early Holocene – even if the terrace has seen considerable transformation since that date and no mesolithic landsurface now exists. On the wider terrace F.398 80cm of late Holocene overbank deposition (Brown 1997b) sealed a possible early Holocene landsurface, burying these artefacts deeply below the reach of plough. This may have implications for the extent of overbank deposits in other areas, such as Springwood. It was hoped that the excavations would enable wider hypotheses about the context of Tweed lithic scatters to be made. Unfortunately the results are not conclusive, because the particular location of Rink, at the junction of two large rivers, and in an area with exposed bedrock, appears to have been significant in determining the comparative stability of this terrace fragment. Certainly the complexity of the river system is clearly demonstrated by the results from Rink, and even if general models cannot be constructed, caution should certainly be taken in assuming that other scatters of material on the lowest terraces of the Tweed are *in situ*.

2.5.5: Sea-level change

One very important factor in understanding the present day distribution of archaeological features is the complex history of sea level change and other coastal geomorphic forces.

Post-glacial sea level changes arose from the interplay of absolute sea level change (glacio-eustasy), the rebound of the land-mass after the removal of glaciers (glacio-isostasy) and the depression of the ocean floors under the weight of the extra water (hydro-isostasy). Glacio-eustasy is the absolute change in sea level caused by ice down-wasting. By *c.* 6000 BP the North American and Scandinavian ice-sheets were gone and absolute sea level stabilised (Gordon & Sutherland 1993: 43). Glacio-isostasy describes the continuing steady rise of the landmass of Scotland after the glacier's weight was removed. Uplift has not been even or constant. The area of maximum uplift is Rannoch Moor, centre of the ice formations in the last glaciation. Away from here the amount of uplift decreases relatively steadily (Figure 48).

Uplift varied in pace, slowing throughout the Holocene (Pethick 1984: 224). Hydro-isostasy describes the depression of the sea floor caused by the increased weight of water in the oceans. The interplay of these factors gives rise to the sea level at any one time. Occurrences of 'still stands' (times of relative stability in the level of the sea) are important in determining the formation of fossil coastal features.

Sea-level change in Scotland can be traced at both general and local levels. Sea level at the beginning of the Holocene was high, especially compared to glacial periods. By *c.* 9600 BP the increasing pace of isostatic uplift stabilised relative processes, forming a fossil coastline above present day datum (Main Buried Beach). As isostatic uplift continued relative sea level fell and a fossil coastline below the present day sea level was cut at *c.* 8600 BP (Low Buried Beach). Isostatic uplift continued to cause a relative fall in sea level until approximately 8300 BP, the lowest sea level in the Postglacial. Eustatic sea level rises then became the dominant process as isostacy slowed and a long transgressive episode began. The dates for the culmination of this vary according to distance from the isobase centre on Rannoch Moor. Areas closer to the centre saw formation of fossil Main Postglacial Transgression (MPGT) shorelines earlier than peripheral areas: the MPGT *does not* provide an absolute national date. The fossil cliffs of the upper Forth date to *c.* 6800 BP whilst in the northeast studies from areas such as Philorth date the transgression maximum to *c.* 6000 BP (Smith *et al.* 1982: 334). The altitude of the MPGT also varies, from *c.* 15m OD in the Forth to 7m at Montrose and declining further northwards as glacio-isostatic rebound becomes less significant. It was during these transgressive episodes that the deposits of carse clay were made. By *c.* 6000 BP the rates of glacio-eustatic sea level rise slowed due to the exhaustion of the main glacial sources, and sea level began steadily to fall to its present levels. In some area a series of still stands led to the formation of lower and poorly understood fossil features. At Philorth two transgressions are recorded in estuarine conditions (Smith *et al.* 1982) whilst at Forvie a series of terraces are recorded to the north of the estuary (Wright & Ritchie 1975). Recent discussions about the changing land- and seascapes of the North Sea Plain clearly highlight the magnitude of these processes and the extent to which we must be aware of particular ways in which long term, large scale processes integrate with local landscapes. B Coles' detailed reconstructions (1998) include consideration of the forebulge of the earth's mantle caused by the weight of the ice sheet (Figure 49). She suggests that 'Doggerland in the Devensian was perhaps not the flat low-lying plain suggested by a simple consideration of changing sea levels and present day contours' (B Coles 1998; 44) and must be considered to be an environment suitable for inhabitation, not just a land-bridge from the continent.

Sea-level change is not simply the story of the vertical rise and fall of water. The changing relative positions of land and sea also have to be understood horizontally and in terms of coastal processes. As sea level changed the forces acting on any area of the coastline of eastern Scotland also changed, requiring new kinds of equilibrium. Large amounts of sediment were worked and reworked as beaches found ways of stabilising (**6**). The most dramatic single event on the east coast was the 8m high tsunami of *c.* 7000 BP caused by a rock-slip off of the Norwegian coast (Dawson *et al.* 1990).

All of these varied processes have implications for the archaeology of the coastal zone. Three main archaeological problems may be highlighted: erosion, burial by sand or burial by sea level change.

Water erosion is a threat to the littoral zone and a series of coastal erosion surveys have been carried out to assess the character and extent of this threat. A number of comments may be made on the basis of the surveys undertaken so far. The archaeology of the coastal zone is not well known. Surveys of the Forth and Fife recorded 456 new sites as well as the 859 sites already on the NMR (James 1996; Robertson 1996; Robertson & Miller 1997). Whilst the recognition of many of these sites may reflect changing archaeological concerns (especially the archaeology of the twentieth century) certain parts of the coastline are little-known archaeologically, *e.g.* the foreshore (Robertson 1996). Secondly, the stability of the coastline varies greatly and generalisations cannot do justice to the complexity of local coastal processes. Thirdly, where it is taking place, erosion can be dramatic and swift. Given these factors assessing the overall significance of erosion is problematic. Division by 'beach units' offers some help but these foci are not necessarily relevant for archaeological concerns and there is no necessary relationship between landscape type and erosion. Coastal processes must be understood locally, as the product of the interplay of a number of factors. For example, in a general sense Scotland's coastlines are in retreat, due to a decline in the amount of sediment available, but this statement hides a lot of local variation. In Grampian a large number of beach units are classified as simultaneously eroding, prograding and remaining neutral, although in general the tendency is to erosion (Ritchie & Mather 1984). Mesolithic sites have undoubtedly been lost to erosion but the extent of the problem is impossible to quantify. Both shell middens and flint scatters could easily be removed by waves. Interestingly there are no recognised instances of mesolithic sites being discovered by sea erosion on the east of Scotland and it may be that the continuing process of isostatic uplift has removed many previously coastal sites from the immediate threat of the waves.[26]

Even when raised above erosive contexts coastal archaeology is not straightforward. Eastern Scotland offered an ideal environment for sand movement during the time that the sea was retreating, and landscape change has been extensive. In places mesolithic surfaces are clearly deeply buried. At Corbie, Lunan Valley, 2m of sand was wind deposited on top of an early medieval plough soil, whilst to the north of Lunan water >1.2m of sand were dumped on pastures and terraces (Pollock 1985; **App. 4**). Sand dune systems, such as Forvie, can offer rare zones of preservation in a lowland context (Ralston 1997) but the archaeology of these areas is complex. These problems and the particular processes in operation along the east coast are discussed in detail in Ch. **6**.

The changes in the sea level in Scotland have serious implications for trying to understand the influence of the coast upon settlement. The account offered above shows the following.

c. 9600 BP Main Buried Beach: above present sea level
Any sites associated with this beach are now buried in carse clay or beach sand deposits.

c. 8600 BP Low Buried Beach: below present sea level
Any sites are off shore, buried in sediment.

c. 7000 BP tsunami
Burial/destruction of sites

c. 6800-6000 BP MPGT: above present shoreline
Transgressing seas would have covered/destroyed any coastal sites predating the Postglacial maximum. Sometimes this material is redeposited in beach terraces, as for example in Jura (Mercer 1968-80) and, famously, in Ireland where 'Late Larnian' artefacts form part of the raised beach matrix (Lacaille 1954). No sites of this type are known in eastern Scotland. Once the MPGT was completed coastal sites in areas of isostatic uplift are 'safe'.

The consequences of this are dramatic. If we assume that the systematic later mesolithic inhabitation of Scotland post-dates approximately 8500 BP and lasts until approximately 5000 BP somewhere between 1700-2500 radiocarbon years of coastline are missing from a period of 3500 years. In other words for over 50% of the mesolithic we will struggle to locate coastal sites, except in extreme and fortuitous circumstances. Particularly concerning

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[26] An important implication of this argument is that in the small areas of Scotland which are not being uplifted today mesolithic sites would be at risk from wave erosion.

are the implications for understanding the significance of the coast to mesolithic lives. Many coastal sites, and the vast majority of middens, must post date *c.* 6800-6000 BP and it remains unclear as to whether this reflects survival or a conscious change in mesolithic lifeways. Scotland is a small country, with a dissected coastline where the shore is rarely more than 30-40 miles away, often much less, and it is likely that the resources of the coast were important, if not dominant. It therefore appears unlikely that we will ever be able to systematically examine patterns of land-use for the earlier part of the period.

2.6: Survey of the Burn of Calleter

Because of the extent of biases, identifying the mesolithic, especially in the blank areas of our map, remains a very important goal of research. To this end a small-scale survey of an upland landscape was carried out in Summer of 1999. My interest was in organising fieldwork designed to try and tackle some, at least, of the biasing factors affecting our understanding of the mesolithic landscape and to establish a methodology for upland survey. The Calleter survey investigated the possibility of settlement in a quartz-rich area, integrating geomorphic mapping and investigation of a river terrace system with test pit excavation in order to identify prehistoric occupation. The palaeoenvironmental work awaits completion, and my discussion here is focused on the attempt to identify the mesolithic in an upland landscape.

2.6.1: Location

The Burn of Calleter is high in the eastern flanks of the Grampians (Figures 50-51). It is a tributary of the West Water, itself a tributary of the North Esk. The particular focus of test pit survey lies near Braco, at the confluence of the Burn of Calleter and the Burn of Duchrey in a deeply incised over-deepened valley with nine terrace levels above the modern rivers. The rolling hills above the valley are poorly drained rough pasture with the exception of one field of slightly improved crop immediately above the confluence. This has not been available for examination.

2.6.2: Aims

The survey at Calleter took place as part of the University of Edinburgh's Angus and South Aberdeenshire Fieldschool (henceforth Fieldschool). The primary palaeoenvironmental aim for the Fieldschool is to establish change in the environment of Angus and South Aberdeenshire since the end of the Devensian Glaciation and to examine the relationship of these processes to human lives in the region. One aspect is the determination of landscape formation through geomorphic analysis in archaeological study areas. Previous seasons of research had identified the importance of the geomorphic sequences in the Calleter area (G Coles & Church 1998; Church & Coles 1999; G Coles *et al.* 1998) as well as the intimate relationship between these features and archaeological remains. The palaeoenvironmental aims of fieldwork in 1999 were to undertake EDM survey of the Burn, and to assess the character and date of the terraces by examining the body of the selected terraces and investigate, by trial trenching, any archaeological features on those terraces.

My involvement aimed to examine mesolithic settlement in an upland environment. The Calleter region offered a series of significant archaeological challenges in terms of biases identified above: it was upland, unimproved, with no history of research, only lightly populated and, most of all, with a clearly active and complex river-terrace system. Alongside these factors, Calleter is abundant in natural quartz, and the possibility of identifying mesolithic quartz working was an important consideration. To this end it was considered a worthwhile exercise to combine the aims of palaeoenvironmental survey with the search for the mesolithic and a much more extensive test pit campaign was therefore undertaken than would have been the case for palaeoenvironmental work alone. Of course, any test pit campaign in the uplands has but a small chance of identifying settlement (Bang-Andersen 1987). One of the attractions of Calleter was that test pits could focus on south- and east-facing slopes and terraces above a river junction, on a stream that in its lower parts is a well-known salmon river. Such a location had many similarities to mesolithic sites lower downstream on rivers like the Tweed, Dee or Ythan. Although in the context of a wider survey such determinism should be avoided, in a small survey like this it seemed sensible to try and maximise our chances of success.

2.6.3: Methods

The Survey was a small-scale project undertaken as part of the Fieldschool and as a teaching exercise. Alongside EDM survey of the Burn of Calleter 39 1 x 0.5m test pits were excavated in a defined area in between the two rivers (Figure 52). Test pits were located to ensure good coverage of all terraces. All spoil was sieved at 5mm, and due to the difficulties of identifying worked quartz in the field, all quartz was retained for laboratory analysis. Alongside the survey of Calleter, sieved quartz samples recovered from test pits excavated as part of palaeoenvironmental investigations on sites at the Hill of Rowan have also been analysed.

2.6.4: Results

2.6.4.1: Geomorphology

Although not the primary aim of this discussion it is appropriate to report, in brief, on the geomorphic sequence and the attempts to date this sequence (for detail see Church & Warren 1999). Nine major terrace levels were identified with small subsidiary terraces: Terrace Level 1 (TL-1) is the lowest, TL-9 the highest. Archaeological features were identified and excavated on three terraces: a faced dry-stone wall running on the edge of a terrace fragment (TL-2); a Medieval or Post-Medieval upstanding dry-stone structure (Str1) on TL-l; and a poly-cellular dry-stone and turf-walled structure (Str2) of unknown date on TL-9 (Church & Warren 2000). Of these, only Str1 offers any strong indication of date for the terraces: the structure is cut by the modern burn, and overbank deposits are accumulating around it, proving that terrace accumulation on TL-1 is ongoing.[27] Large fragments of birch were discovered in waterlogged clay deposits on TL-9. Although suitable for dating, this material would only provide a TAQ for the terrace. Deposits suitable for Optically Stimulated Luminescence dating (Renfrew & Bahn 1996: 147-8) have been identified at Calleter but await analysis. The geomorphic sequence therefore, is only relative at this stage but appears to include an important suite of higher level terraces of Lateglacial date (TL 4 and higher). Downcutting presumably occurred in conjunction with regional afforestation and changes in sediment supply throughout the Holocene stemming from both climatic and human influences.

2.6.4.2: Lithics

A total of 5172 pieces of quartz were recovered from test pits of which 44 (0.9%) were worked or possibly worked (Figure 54). Two finds were made during the excavations of Str 1 and 2 (**App. 5**). No other knapped materials were recovered. The material is all undiagnostic.

The difficulties of analysing quartz industries are relatively well known. In these assessments a category of 'possibly worked' is utilised for pieces which betray some signs of knapping but not sufficient to certainly label them as an artefact. They are often differentiated from the

[27] This interpretation receives further confirmation from the conditions of Level 1 after severe rain. Clear flood channels through vegetation could be identified, with some consequent deposition, and in one notable instance, a rather sorry-looking stranded fish, some metres away from, and above, the Burn.

terrace material by their raw material type and freshness, but without clear bulbs or platforms (see **App 5.2** for further discussion and comment on this methodology).

Flakes, chunks and irregular cores dominate the quartz recovered and bipolar cores are important (Figure 54). No pieces are retouched. The overall numbers of artefacts are very low, but have an interesting distribution (Figure 55). 15 come from TL-2, including refitting pieces, and 9 from TP27 on this level (included 4 out of the 15 definitely worked). In contrast no artefacts were recorded on TL-5. There are also differences in the types of quartz worked on different levels: for example TP27 (TL-2) includes fine-grained grey-white quartz. It is possible that the artefacts from TL-2, found in association with the faced dry-stone wall noted above, are *in situ*. However the material is not diagnostic, and may only tentatively date the terrace to the prehistoric period in the broadest of senses. TL-1 includes quite high concentrations, including the most convincing artefact of the assemblage, a neat platform flake discovered 30cm deep within overbank silt deposits. It is difficult to assess these finds, which are not *in situ* and may have been deposited by the river, as they are much more frequent to the terrace edge than under TL-2. The presence of apparently worked material in the riverbed should also be noted (although the sample is very small). The source of this material is unclear (see below)

2.6.5: Conclusions

The survey of Calleter has not identified the mesolithic in the study area. Prehistoric stone working is probable on TL-2 but the association of this with a stone wall, and its location so low in the terrace sequence is hard to reconcile with a mesolithic date. The methodology, however, has been successful and the detailed mapping and extensive test pit coverage of the area is worthwhile on several levels. In terms of identifying the mesolithic it should be recalled that the study area is very small.

One area of some concern must be highlighted – the analysis of quartz industries (see **App 5** for more detailed discussion). Two factors are significant. Firstly 2 flakes identified in Str1 both displayed good percussion evidence on good quality quartz; one in particular looked like a classic bipolar flake (STR1. SF002). Yet these artefacts came from topsoil adjacent to a large block of good quality quartz forming part of the wall of the Medieval or Post-Medieval Str1: it therefore seems intuitively likely that the flakes result from the construction or collapse of this structure. Secondly there must be concern about the artefacts discussed in TL-1. Although some of these pieces have convincing morphology, their similarity to the fresh, seemingly worked material in the riverbed is alarming. It is of course possible that these pieces are re-deposited from further upstream although that the pieces are so fresh would be difficult to explain. It is therefore possible that these pieces are merely fortuitous fractures that have, naturally, replicated features normally associated with human activity such as platforms. Possibly 1% of any given quartz-rich terrace will look worked if an analyst spends enough time examining it. This implies that quartz working can only be identified in relationship to the particular local characteristics of the material, and that therefore, the total retention of all quartz in surveys of this type is important not in order to ensure that coherent standards of identification are utilised in the survey as a whole, but in order to allow pieces to be judged in the context of the naturally available material.[28]

[28] And the experience is borne out by the difficulty of interpreting the occasional isolated pieces of quartz that may turn up in assemblages.

Discussion

This review has highlighted a range of problems and potentials with the material evidence available to us. Our data is dominated by stone tools, and our prejudices and expectations contribute greatly to our assessment of this material. There are significant problems with dating features and it is likely that many categorisations of the 'mesolithic' are not accurate descriptions of prehistoric realities. At the regional level the distribution of material is subject to a significant number of biasing factors, ranging from the extent of sea change during the Holocene to the extent of commercial development in the twenty-first century. Long-term, intensive multidisciplinary studies of landscapes are required to redress the present situation. These are expensive, and have tended to focus on areas of good preservation. In Scotland these have tended to be in the maritime west, although the full potential of the east is not well known.

The focus on the west is of real interest, and is the last significant biasing factor in trying to understand the character of mesolithic settlement in the east. In general preservation conditions on the west coast are undoubtedly better; agriculture is neither as intensive or destructive as it is in the east and lower levels of population and urbanisation also contribute. But good preservation is not a western monopoly; features at Manor Bridge for example are sealed under 50cm of sand (**App 2.3**), whilst *in situ* artefacts have been revealed by sand dune movement on the Sands of Forvie (**6.4**) and structural evidence survived at Nethermills. It seems likely that further investigation of the eastern landscapes, especially upland ones, would only identify increased quantities of well-preserved mesolithic material.

The west coast, and especially islands, appear to attract a disproportionate amount of archaeological interest, possibly because islands often offer a remarkable potential for the combined analysis of archaeological and environmental features, as for example in the case of the MPGT so clearly visible in the area. Islands are bounded territories, and so apparently easier to reconstruct than the less sharply defined landscapes of the east. And, of course, these islands are inherently attractive locations. The history of research in the area may itself also be significant, with greater levels of detail being extracted from an island as new approaches, questions and analyses see some of the same faces returning time after time.

Despite the dominance of the west in our studies of the Scottish mesolithic it remains entirely unclear that the interpretations gained from these contexts are appropriate to eastern or upland Scotland. Notwithstanding difficulties with studying the earlier coastal mesolithic, the eastern mesolithic is full of potential, and substantial investment of time and effort is required to rescue as much information as possible before it is lost to plough or rotavator, erosion or development. The present database is informative, if flawed, and it should provide the basis for the establishment of interpretations to be tested by future research. In the next chapter I discuss some general interpretative models for the data. In combination biasing factors imply that, at this stage, any systematic or quantified understanding of the extent of mesolithic settlement in eastern Scotland is impossible. However a range of material is available enabling us to examine a number of important aspects of this data, including social relations.

Chapter 3: Making sense

> 'Know what he (an anthropologist) thinks a savage is and you have the key to his work. You know what he thinks he himself is and, knowing what he thinks himself is you know in general what sort of thing he is going to say about whatever tribe he happens to be studying. All ethnography is part philosophy and a good deal of the rest is confession' (Geertz 1973: 246).

In order to consider the interplay between landscapes, context and experience central to a social archaeology of the mesolithic in eastern Scotland it is necessary to analytically move between particular accounts of places and times, and wider understandings of the behaviour of the people in question. This is enabled by the construction of generalised models. Models are objectifying analytical mechanisms that simplify variability observable in reality in order to identify patterns. Model making is a heuristic process and a model should be judged not only by its fit to the data, but also by its ability to inform us about the object of our analysis. I have argued that the archaeology of the mesolithic in eastern Scotland should focus upon the production of social people rather than reified units and my assessment of existing models is based upon this assumption.

It is important that we do not confuse the reality of the model with that of the prehistoric reality we are analysing, and that we remain aware of the distinctions between the logic of the model and those of that reality. A range of analytical approaches have been taken to the study of the mesolithic (Rowley-Conwy *et al.* 1987) and to gatherer-hunters more generally (Barnard 1983, Bird-David 1996) but many archaeological models of gatherer-hunter lives are undertaken within functionalist or social evolutionary frameworks (see Young 2000: 1-3 for discussion). These broad-scale models are often constructed around the baseline of economic practices, stressing exploitation and ecology (Smith 1992: Ch. **2**; see **3.1**). Such models obscure as many aspects of mesolithic life as they reveal: focusing upon long-term adaptations and reified units rather than the interplay between material culture and identity. They appear to provide a series of *rules* for human behaviour, expressed most clearly in behavioural ecological analyses, such as optimal foraging theory. For a social archaeology a more appropriate approach to the logic of human practice may be to consider *strategy:* 'to substitute *strategy* for the *rule* is to reintroduce time, with its rhythm, its orientation, its irreversibility' (Bourdieu 1977: 9, emphases in original). This is particularly significant in a situation when temporality is constitutive of meaning, as with gatherer-hunter interaction with place (see below).

Here I turn critical attention to two of the dominant approaches in contemporary gatherer-hunter archaeology: first those that reconstruct gatherer-hunter mobility by reference to economic practices, and secondly the construction of so-called 'complex hunter-gatherers'. As well as theoretical critique I will demonstrate that these models of mobility and complexity offer a very poor fit to the eastern Scottish material. Finally, I will establish some broad frameworks for this evidence, stressing the need to be able to understand variation as a key aspect of the evidence and not just as a product of analytical difficulty.

3.1: Mobility and economics

Operating within functional paradigms, a series of attempts were made in the late 1970s to examine the characteristics of gatherer-hunter mobility in the present and, by reference to this, in the past. Mellars' (1976a) examination of functional variation in site types in Britain and Binford's (1980) distinction between logistical and residential mobility are both now over twenty years old and have seen little explicit critique (see below). Both models have proved incredibly influential; are embedded within introductory textbooks (*e.g.* Smith 1992) as well as cited in developed arguments about gatherer-hunter life (Simmons 1996: 201). Given developments in many other aspects of our discipline the dominance of these papers is striking, especially given that Mellars' article is a short paper with serious, recognised, empirical flaws rather than a watertight extended thesis.

3.1.1: Highs and lows

Mellars (1976a) constructs a typology in order to examine mesolithic sites in terms of *function*. The basis of this analysis is the size and character of the site and the composition of the assemblage: a range of 'core tool types'[29] are important, although the main classification is based upon the relative proportions of scrapers and microliths. Type A assemblages are often small and found in the uplands; they have very high proportions of microliths and very few 'typical' scrapers. The presence of hazelnuts may indicate summer/autumn occupation. Type B assemblages are 'balanced'. They have lower proportions of microliths, more 'typical' scrapers, a range of other artefacts and are found in a range of locations. Mellars' assumes that microliths are projectile points (1976a: 396) and that red deer form the basis of the economy. Using a combination of archaeological, ethnographical and ecological data he argues that the dichotomy of assemblage-types A and B reflects upland summer hunting camps and lowland winter base-camps. The movement of human groups is seen to mimic the seasonal rhythms of red deer aggregation and dispersal. This model of movement onto the hilltops in spring/summer and aggregation in the lowlands in winter can be criticised on both theoretical and empirical grounds. Mellars analyses early and later mesolithic sites in the same model, and few Scottish sites are considered. This is an abstract pan-mesolithic, pan-British model rather than a serious attempt to understand particular gatherer-hunter landscapes of the past. Although its pattern of movement seems intuitively plausible this is

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[29] Microliths, scrapers, axes/adzes, denticulates, burins and (to a lesser extent) cores and microburins.

because of the supposed ethnographic familiarity of the model (Spikins 2000) rather than its applicability to a Scottish context.

Myers (1987) looks in more detail at the increased intra-site variability in the later mesolithic observed by Mellars (1976a: 395). He argues that due to the use of component redundant technology, microliths are more frequent on later mesolithic sites *anyway*. The increased absolute numbers of microliths in the later mesolithic therefore means that many 'microlith dominated' sites of the later period are actually functionally comparable to 'balanced' assemblages of the earlier period. Therefore the distinctions between Type A sites (most of which were later mesolithic) and Type B sites (of mixed date) are not clear (Myers 1987: 147). This removes some of the basic justification for Mellars' model: upland sites are small and still have some evidence for summer occupations, but are not necessarily dominated by microliths. Myers (1987: 144) accepts Mellars' assumption that microliths were projectile points and that therefore, the proportion of microliths on a site relates to the extent of hunting. Despite Myers' assumption it seems likely that, in Scotland at least, microliths were multi-purpose tools (Finlayson 1990; Finlayson & Mithen 1997) and this further weakens any link between upland sites and small-scale hunting expeditions. One half of Mellars' scheme therefore appears to be founded on dangerously weak grounds.

The notion of a 'balanced' assemblage is also rather problematic. 'Balanced' implies equal or appropriate proportions of elements (Oxford Dictionary 1995) and, to my mind, it is unclear that a description of an assemblage as balanced does not imply an inappropriate normalising judgement, especially when it is based on such a small analytical base. Furthermore microwear analyses demonstrate that it is difficult to establish a categorical relationship between a tool-type (microliths or scrapers) and the potential use of this tool-type in the past (see for example Finlayson & Mithen 1997). Our modern analytical categories may not replicate meaningful distinctions of activity in the past and this implies that there are significant problems with trying to establish functional roles on such a crude basis.

In any case the movement of deer in Scotland is not as straightforward as implied by Mellars' model (Finlayson 1990) and the importance of red deer to the diet of mesolithic inhabitants of eastern Scotland is not clear. The only evidence for the consumption of *Cervus elaphus* is from Morton B, where bones representing a minimum of two individuals were found. Two individuals of *Bos primigenius*, one *Capreolus caprea* and a single *Sus scrofa* were also found at Morton B, suggesting a generalised rather than specialised terrestrial hunting economy, although drawing any firm conclusions from the small sample of bones from this one site is obviously not appropriate.

These concerns about the relevance of this model to the Scottish context are highlighted by the lack of patterning in the evidence. Finlayson & Edwards (1997: 115) observe that 'it is notable that unlike in England microliths dominate most assemblages regardless of site location'. This statement was mainly based on sites in the maritime west, and therefore some examination of the composition of eastern scatters is required here. All excavated and surface collections with quantified data were collated and Mellars' categorisations reproduced as closely as possible.[30] The data are presented in groups of excavated and surface material. There are real problems with these data, conditions of collection varied greatly, but notwithstanding these problems, the data do not fall into Mellars' categories (Figure 57).

Microliths do not dominate all sites in the east: of excavated sites or those with controls on surface recovery only Forvie, Fife Ness and Nethermills have over 75% microliths. Grieve C (the surface collection from Nethermills) includes a very high proportion of scrapers, suggesting that these were preferentially collected over time from the surface at this site, inflating the proportion of microliths later excavated on site at Nethermills. Aside from these three sites (which are associated with very different locations, assemblage sizes and structural evidence) scrapers are often as common, or nearly as common as microliths. Many of the assemblages from the east are therefore 'balanced' on this criterion, although this category conceals important variation and includes sites from a range of locations and of varying sizes. Variation in the proportion of burins is interesting, but there are problems with the identification of this tool type (**2.2.1.2**) and it is difficult to assess the significance of this factor. More variation can be identified in the number of cores present. It would be easy to make too much of rather uneven data but there is little sense of a highly specialised or differentiated use of the landscape here.

Finally, Mellars' reduces mobility to the playing out of economic extractive practices and objectifies the communities he studies. For example, he argues

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[30] Mellars had not included 'concave or atypical' scraper forms, these have been included in these analyses and, therefore the percentage of scrapers may be inflated slightly, but this distortion is

> 'the formation of large social units during some stage of the annual cycle is usually essential not only to achieve the optimum exploitation of the available food resources but also to provide the social integration necessary for the organisation of ceremonial activities, exchange of marriage partners and so on' (Mellars 1976a: 385)

Mellars' argument here is revealing, for he appears to be treating the unit as a whole, rather than considering the role of agents in forming a community. In contrast to his argument that social integration follows *upon* the formation of large units I argue that the formation of large units is enabled *by* effective social integration. The ability to integrate varied parts of a community relies upon effective social reproduction, in other words that people have learnt how to act in the expected fashion; for example expectations that different parts of the community will act out certain roles in a ceremonial – some providing food, others song. The arrangement of ceremonies and weddings is an essential part of holding larger units together, not vice-versa. To assume that this integration is achieved is to deny one of the central social achievements of small-scale societies – their ability to reproduce structures of knowledge and behaviour over time. Myers' argument deserves repetition, noting the

> 'positivistic bias of treating bands as given; the formation of a group should be seen as a social accomplishment, and not just taken for granted.' (Myers, F 1986: 72)

Mellars approach takes for granted one of the key themes of social life in small-scale communities. As a consequence he objectifies those communities as a group or band, assuming one of the key areas of analysis for a social archaeology of the period. For this reason, as well as the serious empirical or theoretical difficulties noted above, we must abandon this approach. His model has been significant for a quarter of a century. It is time we moved on.

3.1.2: Logics of residence

The other dominant archaeological approach to gatherer-hunter mobility and exploitation is the differentiation identified by Binford between logistical and residential mobility after a range of ethnographic studies of gatherer-hunter mobility in the present.

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minimal. Site size was identified only (and subjectively) as small or large, due to difficulties with the assessment of surface collections.

Binford considers two types of gatherer-hunters, foragers and collectors. Foragers 'typically do not store foods, but gather foods daily' (1980: 5): they frequently move their homes, practising *residential mobility* and 'mapping onto' the resources of their environment, gathering food on an 'encounter' basis. Foragers are best known in equatorial environments, but other examples include the Bushmen and desert Aborigines in Australia. In differing environments the frequency and scale of movement alters, for example, in homogenous resource areas residential moves will be frequent, but short-lived. Binford raises the possibility of *tethered nomadism* in the context of critical resources, where certain points are key to the seasonal round. Foraging strategies may also involve hunting trips and other activities leading away from base. Foragers are generally of low archaeological visibility except where mobility is tethered to particular locations.

Collector systems are characterised by storage and *logistical mobility*. 'Logistical strategies are labour accommodations to incongruent distributions of critical resources or conditions which otherwise restrict mobility' (ibid. 10), specialised task groups establish field stations in order to undertake specific tasks, procurement is *not* encounter based as it is for foragers. Collectors are characterised by a range of sites; residential bases, locations, field camps, stations and caches. All of these types of site are then further differentiated, and indeed, the different tasks characteristic of each type may be carried out in combination in one place. Binford concludes (ibid. 12) that collector systems will be characterised by higher levels of inter-site variability than forager systems.

Binford's distinction between logistical and residential mobility is clearly of interest at the level of theory and has been influential amongst archaeologists (to a much lesser extent amongst anthropologists), but it is not obvious how it is to be utilised in terms of understanding *real* patterns of human movement. Binford notes that 'logistical and residential variability are not to be viewed as opposing principles ... but as organisational alternatives which may be employed in varying mixes in different settings' (1980: 19, also 12). This fuzziness reduces the potential applicability of Binford's distinctions, for outside of the ideal conditions derived from the internal logic of the model combinations of activity are more likely to be the case both in individual locations and in a society as a whole. However the difficulty of using Binford's schema to interpret archaeological data is often downplayed in the construction of abstracted maps of supposed economic practice (*e.g.* Simmons 1996: 195ff).

In Binford's argument mobility is reduced to economics, despite his awareness that other reasons for mobility existed. Archaeological material is read as the direct representation of human economic activities and the identification of a type of gatherer-hunter economy is enabled by the resolution of material signifiers (archaeological material) into aspects of a system. This is too reductive a procedure. His attempt to categorise types of sites by reference to their function in an economic system collapses because human relationships are social, not just economic, and cannot be reduced to that level. Although procurement is certainly significant in understanding gather-hunter movement, ethnographic studies demonstrate that mobility must also be understood in terms of social relationships, especially in the context of forager societies (Bahuchet 1992; Ingold 1986: 177; also 1988, 1996d; Myers 1986).

There are further difficulties with the application of Binford's scheme to archaeological material. His typology is reliant on our ability to interpret sites in terms of function. Unfortunately in the case of the eastern mesolithic this is rarely possible (**4.1.1**). Midden sites may be interpreted in terms of seasonality and function, as for example at Morton (**2.3.2**), but these are only one aspect of a settlement system and cannot provide all the answers (Finlayson 1990). The extent of variation visible in gatherer-hunters today is also limited compared to that apparent in the past; for example Rowley-Conwy argues (1983: 114) that Binford's scheme does not incorporate mobility types characteristic of sedentary gatherer-hunters. In a British context it seems unlikely that we are dealing with either fully nomadic or sedentary gatherer-hunters. Consequently what we are examining are not absolutes, but distinctions between the amount of stability and differentiation in the use of the landscape; these distinctions are precisely those that will be most difficult to distinguish archaeologically.

The difficulties of utilising this approach can be highlighted by examining Shiplaw (**App. 2.5**; Figures 58-66). This is a small site in the Eddleston Valley, a tributary of the Tweed, seemingly episodically occupied during the mesolithic period. Its lithic assemblage includes microliths (Figure 66) and indicates small-scale tool manufacture and maintenance, and there are clear hints of the curation of cores, especially of high quality flint and chert. The site is located above a small burn, near an important salmon tributary, and to the west the wooded landscape would have been characterised by a diverse loch and lochan topography. In many senses this site appears to be a good example of a specialised hunting or fishing camp, perhaps evidence of logistical mobility. However the assemblage includes a scraper and some notched tools as well as some crude and rapidly abandoned cores, perhaps manufactured on material brought down the burn from the chert-rich hills to the west. These pieces indicate that a variety of tasks were being undertaken on site and that reducing the occupation to hunting alone would not be appropriate. Even assuming that hunting was the dominant activity (which I doubt) neither is it clear whether this can be understood as a residential camp for one family, or a logistical camp for a small group of hunters. The site lies on a natural communication route between the Upper Tweed Valley and the Forth and it is difficult to differentiate between its use as a convenient stopping point *en route* to visiting family or kin in a different area and its use as an exclusively extractive location. This fuzziness is inherent in human behaviour, especially perhaps when the peoples we are studying are unlikely to have conceived of a separate sphere of 'economic' activity. A more appropriate form of interpretation may be to examine the materiality of the site in terms of social relationships and temporality.

3.1.3: Discussion

The dominant models of gatherer-hunter mobility in Britain have laid too much stress on the supposed regularities of economics, creating an abstracted account of the ways in which mesolithic populations engaged with their landscape. Binford's and Mellars' approaches collapse gatherer-hunter mobility into extraction and procurement, consequently offering us little or no opportunity to understand the implications for identity of the dialectic between social relations and mobility. Furthermore, in both approaches gather-hunter communities in the past are treated as aspects of an objectified system, rather than considering any kind of practical situated logic and neither offers an opportunity to analyse social reproduction.

And yet it is important that we make some attempt to engage with mobility and the economic base of mesolithic people, for it would be foolish to contend that we can understand gatherer-hunters without any understandings of the ways in which they moved around the landscape. Ingold argues that 'nomadism' is too vague a term to be of any analytical use and that our definitions of mobility are chaotic (1986: 165 see also Casimir & Rao 1992, Casimir 1992). He notes that *all* groups of people move around the landscape and that, for example, foragers moving their home base need not move further *in total* than a farmer making 'logistical' trips from a stable home base. All human groups make reference to particular places, and therefore one way of characterising mobility is to look at the variation in the relationship between movement and this reference to place, by looking at the scheduling of activity over time (1986: 172). He argues, for example, that

> '... the persistence of points of return in nomadic or 'long-cycle' movement, if measured on an absolute chronological scale, may be considerably greater than that for points in a sedentary 'short-cycle' regime ... The implication is that in the long run, sedentary people may be characterised by a more pronounced 'shiftiness', or impermanence in their ties to specific locales than are nomads.' (Ingold 1986, 180)

Although Ingold does not, at this stage, develop his account to examine the implications of these relationships for identity,[31] this point is significant in trying to understand both the changing archaeological signatures of differing strategies of mobility and also the duration of human association with place. In this context the seeming endurance of many points in the mesolithic landscape, such as Morton, Rink or Dryburgh, is of some interest and may indicate a particular type of long-term relationship between place and community (see below **3.3.2**). Furthermore Ingold's argument demands that we consider more than economics in addressing peoples relationship to place. Abstract maps of economic practice might be created for the mesolithic of eastern Scotland, but it is not clear how meaningful these would be. In part this reflects difficulties with the present data set, but also inherent problems with such analyses. Rather than determine and delineate movement a more appropriate analytical strategy is to consider the relationship with place mediated by material culture.

[31] There are interesting links here to the later development of the taskscape as a concept with which to understand identity.

3.2: Complex arguments

> 'If we can begin to revise traditional views of foraging societies as small, mobile and simple, and to indicate that *large, fixed*, and *complex* may more frequently characterise prehistoric hunter-gatherers we will have achieved a major goal.' (Price & Brown 1985a. xv, emphasis in original)

A number of attempts have been made to provide broad classifications of contemporary gatherer-hunters (Barnard 1983). After the generalising background of conferences such as *Man the Hunter* (Lee & deVore 1968) studies focused upon ways of classifying diversity (Bird-David 1996: 297-8, Kent 1996). As well as economic practices these accounts have included characterisations of social relations in a broad sense, still undertaken within the remit of traditional social evolutionary categorisations. The basic distinction stressed is between egalitarian, 'band' organised gatherer-hunter communities and non-egalitarian communities associated with property rights, hierarchies, territoriality, and sedentism.

Egalitarian, band based communities have been described in many different ways but they are characterised by a high degree of residential mobility. They often have a non-differentiated social structure based around a band, which is a highly fluid unit. Typically, such groups have few investments in long-term labour and relatively simple material culture. Examples of egalitarian, band based societies include forest foragers such as the Mbuti and desert dwellers such as the !Kung but not Aboriginal Australians. Egalitarian communities have dominated the anthropological literature, possibly because they have unusual characteristics (Ingold 1999: 399), and also because they have been held to be an exemplar of the most basic level of human social organisation (Woodburn 1980). The characteristics of non-egalitarian gather-hunters are harder to pin down but are clearly demonstrated by considering indigenous coastal communities of the Northwest coast of America. These varied groups had permanent houses, villages of over 1,000 people, social stratification including hereditary slaves and ranked nobility, art and economic specialisation (Suttles 1968).

The most familiar *archaeological* approach to this distinction has been to discuss 'complex' societies or 'degrees' of complexity. The differentiation between egalitarian ('simple') and non-egalitarian ('complex') societies is clearly very significant and it is therefore important to review those arguments that address a causal relationship. Four themes are common in the literature: storage, economic system, sedentism and intensification.

Testart (1982) identified two 'radically distinct types of economy' based upon the significance of *storage* (ibid. 523). Storage societies are clearly differentiated from non-storage by Testart, despite ambiguity about 'limited storage' by nomads (ibid. 524). Testart argues that in conditions of abundant seasonal resources with efficient food getting and storing technologies intensive economies would develop, along with sedentism, high population density and socio-economic inequality. Storage was a 'fundamental alteration in ideology' (ibid. 527) and the most important revolution in human history, much more so than the neolithic revolution (ibid. 530). Intensive storage economies included those of North West Coast America, southeast Siberia, northern Japan and California.

A more influential account differentiates communities on basis of time-delay between the investment of labour and the product of that labour (Woodburn 1980, 1988). *Immediate return systems* (IRS) are those in which the return for labour is immediate, or effectively immediate. *Delayed return systems* (DRS) are those in which the yield of labour is delayed. Woodburn notes that 'the existence of delay imposes basic organisational requirements for a set of ordered, differentiated, jurally defined relationships through which goods and services will be transmitted in a specified and regulated manner' (1980: 97-98). IRS groups are generally egalitarian, band organised communities. They

> 'are nomadic and positively value movement. They do not accumulate property but consume it, give it away, gamble it or throw it away. Most of them have knowledge of techniques for storing food but use them only occasionally to prevent food from going rotten rather than to save it for some future occasion. They tend to use portable, utilitarian, easily acquired, replaceable artefacts – made with real skill but without hours of labour – and avoid those which are fixed in one place, heavy, elaborately decorated, require prolonged manufacture, regular maintenance, joint work by several people, or any combination of these. The system is one in which people travel light, unencumbered as they see it, by possessions and by commitments' (Woodburn 1980: 99).

Barnard & Woodburn (1988: 11) list eleven exemplars of the type including the !Kung, Mbuti, Nharo, Hadza, Paliyan, Hill Pandaram, Naiken and Batek. Woodburn argues (1988: 35) that 'generalist' tropical environments may be significant in allowing the success of an IRS society.

It is less clear how to characterise a DRS. Woodburn's examples include the Australian Aborigine, the Inuit, the Northwest Coast Americans and the Lapps and it is hard to clearly establish what factors these diverse societies may have in common other than the fact that their labour investment requires a greater or lesser amount of delay. Woodburn stresses the development of kinship relationships as a particular vehicle for the transmission of goods and services and the consequent reinforcement of these relationships in terms of economics and morality.

One of the strongest advocates of complex gatherer-hunters in an archaeological context is Rowley-Conwy. In an influential article he asked,

> 'What characterises the recent hunters who do not conform to the nomadic norm (?) ... Technology is normally much more complex and developed, frequently including items not associated with hunters – sometimes pottery, occasionally even metallurgy, also pecked or polished stone tools, dwelling structures of some permanence, and a great proliferation of food-getting technology. Social structure is also generally more complex. Mechanisms are usually available for the storage of wealth, and some form of ranking is frequently found. The hereditary, ranked aristocracy of the Northwest Coast Indians is the most developed and best known example. Demographically these groups diverge from the nomadic norm in that larger social units exist on a permanent basis. Villages exist which are often many times larger than the hunting band, and although a variety of temporary camps is used for specific tasks, these villages are occupied by at least some of the people all of the time, Overall population density is also higher. Territoriality is marked. Specific groups and individuals do maintain rights to specific resources. In general these hunters are therefore characterised by a greater complexity of their arrangements and may be termed 'complex hunters'...' (Rowley-Conwy 1983, 112)

Rowley-Conwy identifies a range of factors enabling complexity, including the enabling presence of migratory resources with overlapping seasonality. However *sedentism* is key to his model, and is argued to contribute to changes in demographic factors, work effort, dispute-solving mechanisms and therefore internal differentiation. Rowley-Conwy argues that the Ertebølle were a sedentary, complex group of gatherer-hunters, with permanent sites and specialised temporary camps (1983: 125). Price (1985) has also identified a range of other features associated with intensification and complexity in the Ertebølle evidence, although Tilley interpreted the same evidence in terms of gender equality and primitive communism (1996).

Price and Brown identify *intensification* as a key factor in the rise of complexity although they note that causal explanations are weakly developed. Operating within an adaptational framework they highlight *population growth*, *abundant resources* and *circumscription* of resources (Price & Brown 1985b: 8). These lead to intensification, which is archaeologically manifested in changes in *production*, *settlement* and *decision making*. A wider range of resources will be exploited, including those from lower trophic levels or new habitats and requiring increased processing. Changes in the intensity of production are visible in the form of specialised tools, harpoons, nets and hooks for fishing, new containers and grinding equipment for plant processing and ground stone axes (ibid. 10). Settlement becomes increasingly sedentary and sites become larger, demonstrating increased differentiation in internal structure. This differentiation will also be manifest at a landscape level (ibid. 11). Settlements become associated with 'huge' shell middens and substantial architecture such as that of the Northwest Coast Americans as well as cemeteries. Increased territoriality will be apparent through social territories demarcated by stylistic variation; inter-group conflict will rise (ibid. 12). Group size and social differentiation increase as one means of ensuring adequate decision making. This leads to the establishment of wealth and status differentials maintained through elaborate exchange systems and burial rites, lineage systems and increasing ritual activity.

These four accounts all attempt to provide reasons for the differentiation in gatherer-hunter communities today, identifying the importance of storage, the temporality of economic practice, sedentism and intensification as potential causal mechanisms. Complexity has become a dominant, almost orthodox, interpretative framework for the mesolithic of northwestern Europe, argued for example to be very frequent amongst 'temperate' gatherer-hunters (Zvelebil 1987: 8). Although influential these models are problematic on both empirical and theoretical levels, especially in the context of eastern Scotland.

3.2.1: Simple complexity?

One of the striking aspects of the literature on complexity is the difficulty commentators have in identifying the characteristics of 'complex' gatherer-hunters. Notwithstanding supposed material correlates of complexity it is notable that all commentators find it easier to define egalitarian communities than they do non-egalitarian. This is a matter of concern, for it implies that egalitarian communities are very distinctive. Indeed Woodburn comments that in the contemporary world 'the polarity ... is ... a fact. Hunting and gathering societies are not arranged on a continuum but tend to cluster at one or the other pole' (1980: 114). In fact processes of colonial contact and transformation have affected the contemporary significance of IRS gatherer-hunters. The revisionist debate in anthropology has raised major questions about the extent of social change caused by contact, and the relevance of modern analogues for prehistoric communities (Schire ed. 1984; Schire 1984; Shott 1991). Leacock, for example, has highlighted the major changes in band structure of the Montaagnai-Naskapie of Labrador, noting the importance of trade relationships in the rise of a leader, or contact figure (Leacock 1998: 142-143). Woodburn (1988, see also Lee 1988) has argued that although IRS communities are not a *product* of contact contexts they were more likely to have survived these processes than DRS communities, and are consequently over-represented in the ethnographic present. In the past he would expect 'greater diversity in economy and social organisation' (1980: 112). This implies that the identification of a 'complex' gatherer-hunter is, in some senses, meaningless, as it can be seen to be a dichotomous attempt to label one extreme of a varied spectrum of gatherer-hunter communities. This is nowhere more clearly demonstrated than in the repeated use of Northwest Coast American communities as exemplars of the type. All the commentators reviewed above use this analogue explicitly or implicitly (also Smith 1992: 25). Not only is this revealing of the difficulty of characterising 'complex' societies, it is striking for three theoretical reasons. Firstly, variation within these communities is downplayed by such analyses. Secondly, the Northwest Coast American communities are *uniquely* complex in a contemporary context, and we must therefore question how representative of a type they are, especially given contact processes. Finally – and crucially given the dominance of this model – *none* of the archaeological manifestations of complexity have approached the level of the Northwest American communities. The Ertebølle demonstrate some hints of social differentiation and intensive fishing practices (see Rowley-Conwy 1983; Price 1985; Tilley 1996), but little evidence of the monumental architecture or extremes of differentiation apparent in the ethnographic *and* archaeological record from the Northwest Americas.

It therefore seems inescapable that the identification of 'complex hunter-gatherers' is dichotomous (*contra* Price & Brown 1985b: 16) and consequently obscures variation. From a situation where analogies derived from IRS groups dominated archaeological analyses we appear to have moved to a position where a uniquely complex group of contemporary gatherer-hunters are held out as an exemplar of a type that all prehistoric communities are to be assessed with regard to. Furthermore, notwithstanding the identification of crude material signifiers as supposed indices of complexity, Woodburn (1980: 113) argued that 'highly mobile groups with simple equipment are as likely to have had systems based on delayed return as on immediate return'. This implies that it will be very difficult to use material signifiers to classify complexity.

A further difficulty is that the identification of variation in gatherer-hunter communities today takes place in a post-contact context with gatherer-hunters operating in restricted and often rather extreme ecological contexts. It is therefore likely that the stark polarity in gatherer-hunter social types present today may be connected to the restricted range of environments inhabited by contemporary or near contemporary gatherer-hunters. Zvelebil's argument that complexity is very frequent amongst 'temperate' gatherer-hunters (Zvelebil 1987: 8) is based solely upon the archaeological identification of certain material signifiers of complexity derived from other environments. This is not to say that this technique is not valid, or that complexity is absent from temperate Europe, but it does highlight the rather fragile way in which this has been constructed.

It is notable that all of the models of causation discussed above are generalising technologically determinist processes. In each instance an economic or technological phenomenon determines the character of social relations. This is rather problematic, and assumes a teleological aspect when used in historical analyses. For if the general law runs that intensification must always lead to complexity, then, given the vagaries of the archaeological record, it becomes easy to establish intensification as evidence for complexity (see discussion of Price & Brown 1985 above). This may obscure those examples of intensification not leading to complexity that might *negate* the generalising law. For example, Testart's (1982) approach to storage appears rather technologically determinist and there is little sense that human choices could come between the establishment of storage and the development of inequality. Ingold (1986: 198-200) notes that most gatherer-hunter societies are characterised by storage of some kind, and that it is necessary to analyse more critically the supposedly casual relationship it has with sedentism, trade or demographic factors. He argues that social relations are key to understanding storage; that the character of these cannot be read from the presence of storage, and that storage is not incompatible with nomadism (1986: 206). In this context Ingold discusses 'caches' of material and it is not clear how opposed this practice is to the 'limited storage' discussed by Testart, who argues that there are no ethnographic examples of the phenomena raised by Ingold. To an extent this objection is not significant: the model discussed by Ingold is certainly possible, and its absence in a modern ethnographic context does not mean it has never been a viable system. In an archaeological context we must be aware of all possibilities.

Notwithstanding these theoretical difficulties there are semantic difficulties with the identification of complexity. The archaeological preference for the term 'complex' is unfortunate. Firstly the notion of a 'simple' human society is somewhat repugnant and derived from crude social evolutionary schema. Secondly, and in seeming contradiction, the notion of 'complex hunter-gatherers' themselves must be situated against the comparative 'complexity' of, say, Iron Age or Viking societies. Here it is noteworthy that some of the stampede of declarations of gatherer-hunter complexity may be related to the desire of researchers to identify meaningful and important gatherer-hunters. In a similar sense to the ways in which models of forest management meant that gatherer-hunters were finally seen to be *doing* something (**4.2**), complexity made our rather esoteric subject matter that little more glamorous.

The identification of 'complex' gatherer-hunters is therefore based on a dichotomous analysis of gatherer-hunter communities in the present bearing a problematical relationship to those existing in the past. The contemporary examples utilised are extreme and it is not clear that any archaeological examples are comparable, especially given difficulties with environmental contexts. The identification of material correlates for complexity is questionable. Originally the aims of many of these classifications of gatherer-hunter communities was to increase our awareness of the diversity of these groups but it is not clear that this has been achieved. The use of a category such as 'complex' lumps varied themes together, hindering our attempts to identify meaningful variation in social relations. Models identifying the presence or absence of complexity objectify social relations by transforming them into a type. Material correlates are read as signifiers of evolutionary process rather than as having real potential for understanding the character of social relations. For example trade is seen as an index of complexity rather than as a phenomenon offering potentials for certain types of relationships with people (**7.3**). In their gently critical reviews of complexity Gould (1985) and Blankholm (1987) suggest that we need to identify in which *ways* societies are complex. This implies that we must analyse the ways in which social relationships are manifested through the inhabitation of a material world. For example, Giddens (1981: 159ff) has argued that a characteristic of social relations in small-scale societies is that they are often carried out at a face-to-face level, and this can be contrasted to societies characterised by the presence of distancing technologies, enabling absent people to be made present within social contexts. For example, chambered tombs of the early neolithic can be seen to be a technology of memory, making the dead or the ancestors present within certain contexts. Similar arguments might be made about mesolithic middens, which are one of the constructions of the period that appear to have affected the landscape at a time-scale beyond the generation. A visit to a midden, depositing material in the expected location, may have served as a subtle reminder of the correctness of an action.

In review, the identification of complexity appears to be a misguided emphasis for a social archaeology of the mesolithic. In this thesis I attempt to come to terms with the particular ways in which material conditions contributed to social relationships rather than addressing abstracted historical processes and assuming that they result in 'complexity'.

3.3: Constructing contexts

> '... it is still difficult to draw generalised patterns, but this is typical of the Mesolithic in Scotland where increasing work still leads to increasing variety in the cultural remains' (Wickham-Jones forthcoming a)

As stated previously, models are heuristic devices, existing only to serve particular analytical ends. I have been sharply critical of existing models of mesolithic society as I do not believe they offer us any meaningful analytical engagement with past social relations. However it would be foolish to contend that any analysis of human lives can be made without reference to the routines and structures of economic practice. To espouse a cultural determinism of this type (Kuper 1999) would be no better than proclaiming that the environment dominates: it is the dialectic between practice and identity that we must study. In this final section I outline some broad contexts for gatherer-hunter mobility and economic practice relevant to eastern Scotland. Given the vagaries of the data set it is unlikely that we can ever fully capture the *character* of mobility at any one time in the mesolithic. However by a focus on the social relationships linking people and place, and especially on temporality, we might be able to approach some of the *characteristics* of that mobility. In particular, I wish to maintain a focus on variability as a key characteristic of the evidence available to us.

3.3.1: Landscape use

> 'even in inland woodlands, there are far more resources than a brief survey of interpretations of subsistence practice might conclude. ... No one resource seems obviously more attractive than any other. Hence defining which resources may have been particularly important and how any resource fitted into an exploitation strategy is a difficult and complex issue.' (Spikins 1999)

Any discussion of human settlement must give consideration to the character of the environment. Scotland lies in northern latitudes in a generally temperate climate. The climate changed dramatically during the early Holocene, and it is not possible to find simple modern day analogues for the situation in the past (**5.1**). Notwithstanding this, it is possible to highlight a broad range of resources then present in the landscape, and to gain some idea of the viability of economic practices. Archaeological images of mesolithic environments have not done justice to the complexity and diversity of natural woodland (**4.1.4**, **4.1.6**) and we have failed to come to terms with the affordances of Holocene forests which were not monotonous stands of old growth but spatially and temporally varied environments.

Spikins (1999) reviewed the range of resources available to mesolithic populations in northern England. Large land mammals have often been assumed to be the basis of the economy. Red deer and roe deer are forest dwelling animals reliant upon large quantities of forage: dense forests, despite spatial variation, are not always ideal environments for these animals. Wild boar however are animals of dense, especially oak, forests. Spikins therefore suggests that the importance of boar may have increased throughout the mesolithic as forest density increased. It is notable that in the north of Scotland, where oak was less common (**4.1.5**) boar may never have been as significant. Aurochs, elk, reindeer, bear or wolves may also have been significant at different times, and it is important to recall that, as well as meat, game provided hides, sinews, bones and antler. Some animals may have been of considerable symbolic importance. It is impossible to read the possible significance of specific animals from their presence in the environment in any detail. Spikins (1999) argues that the importance of large game has been greatly inflated in our accounts of the period, although the kill may have bought important status to the hunters. Often hunting trips do not return with large kills, but small game instead. A single hedgehog bone, for example, was found at Morton (J Coles 1971) although it is difficult to assess whether this is in context or intrusive. Some small game may have been very important for the exploitation of furs, for example beaver. These factors in combination with the discussion of the faunal evidence from Morton (**3.1.1**) perhaps suggest that no single resource dominated the taskscape, especially given differences in environment between areas.

Plant foods are also likely to have been significant (Zvelebil 1994). Clarke argued that 200-450 edible plant species were available in Europe, and demonstrated the ways in which microliths may have formed part of composite plant processing tools (1976: 453-456). Bonsall (1981: 461ff) has demonstrated that in Britain plant foods are unlikey to have provided the basis of subsistence due to their low protein content. However plant foods are acknowledged to have offered potential variety to the diet, especially in terms of starch and sugar. A wide range of edible roots, tubers and seeds were available in the Scottish landscape and plants may have been especially important in riverine contexts (Malanson 1992; Spikins 1999). Fruits, greens and fungi are all likely to have been important resources and at Morton B a small range of macrofossils from edible plants was identified (Figure 15) but archaeological discussion is dominated by hazelnuts, possibly in part because of taphonomic issues (**2.2.2**). Assessing the significance of plant foods is problematic, plants dominate gatherer-hunter diet in arid areas but this is not true of all environments and it has been argued that they are unlikley to have contributed significantly to the diet of northern foragers (Bonsall 1981). It seems likely that plant foods were seasonally significant resources rather than a dominant feature of the diet throughout the year. In any case plant foods often entail considerable processing costs and may be scattered throughout the landscape. Plant resources may also have been associated with female labour, and have had some impact on the location of sites (Spikins 1999). The social importance of these resources might have been considerable. Not only did plants provide food, they could also be utilised for medicine, dyes, narcotics, clothes or containers – as, of course, could large and small mammals.

One key theme in this discussion is the importance of riverine ecotones in a woodland context. As well as providing a wider range of habitats due to channel migration and displacement riverine contexts would have provided a natural conduit for the movement (and watering) of game. The areas also included a wider range of edible plants. Rivers and wetland locations would have provided preferential habitats for a variety of birds and would also have been important in terms of fish, both anadromous and freshwater (**5**).

In northeast Scotland the distribution of mesolithic material appears to demonstrate the importance of rivers. In Strathnairn extensive field survey by Reading University suggests that mesolithic flint scatters were tightly focused on the river banks and coastline, for example near the Great Moss of Petty, possibly a tidal basin in the early Holocene (Bradley 2000b). In contrast later prehistoric material is found more extensively in the landscape. Kenney's (1993) study of the Dee observed a similar distribution. Most mesolithic sites are within 100m of the riverbank whereas neolithic sites are found more extensively (ibid. 212). Biasing factors, such as the location of ploughed land, may have been significant but Kenney's small-scale fieldwalking exercise concluded that 'despite demonstrating that flint scatters are to be found away from the river, this study has been unable to demonstrate the existence of Mesolithic activity more than 1km from the Dee or any of its major tributaries' (ibid. 225). There is a notable concentration of sites near Banchory in the region of the junction of the Dee with the Water of Feugh – a famous salmon river (**5**). The best known site is from a little further downstream at Nethermills, where a hut and pit complex has been excavated (Kenworthy 1981) but other famous scatters, such as Banchory are also significant (Patterson & Lacaille 1936). Kenney argues that this area is the location of base camps and that smaller coastal sites were temporary locations, and that the coast was significant for flint (ibid. 229ff). Other rivers also appear to have bee significant, for example the Ythan. However there are surprising anomalies in the distribution of material. For example, the almost complete absence of mesolithic sites on the Don is striking. Notwithstanding this the importance of rivers in the northeast is comparatively clear, and although the situation in the Tweed valley is slightly different, suggesting a more extensive use of the landscape, the river was also clearly significant here (see below). It is difficult to interpret this phenomenon too closely, as rivers may have been attractive for a number of reasons, from the availability of resources such as fish through to a communications route in woodlands.

Another group of resources are those from maritime contexts. Whale bones have been found in Scottish contexts, although it is assumed that these are derived from chance strandings rather than from organised hunting. Similarly remains of dolphins from Cnoc Coig, or Sturgeon from Morton (Mellars 1987, J Coles 1971) may represent either chance exploitation or deliberate acquisitions. Seals may also have been important, possibly for hides as well as meat. A variety of fish were exploited, the evidence from Morton suggesting cod fishing beyond the immediate shoreline (J Coles 1971: 353); many migratory seabirds could also be taken. And, finally, shellfish were also available, although the relative importance of this resource to the diet is not well understood.

The coast has an axiomatic role in contemporary interpretations of mesolithic society in Europe, often in association with claims of sedentary, 'complex hunter-gatherers' (**6**). Indeed, the importance of the coast to gatherer-hunters in the west of Scotland appears to be clear. However the evidence from the east suggests that coastal sites were not the dominant points of the landscape (see Ch. **7** for detailed discussion).

In considering the characteristics of mesolithic settlement one of the most important factors in any consideration of the Scottish landscape is the relative proximity of varied environments. Regardless of spatial variation in the composition of the forest communities (Ch. **5**) the presence of substantial vertical relief and coastlines is of considerable importance for understanding the distribution of resources and by extension gatherer-hunter settlement. In the east broad valleys drain the uplands, providing arteries of communication and access. The steep valley slopes, rising in many cases onto more or less dissected plateaux such as the Southern Uplands or the Cairngorm massif, provide relatively easy access to different types of environment. In any case the inland areas were far from homogenous, but broken by lochs, lochans and areas of varied forests. The effects of rapid deglaciation were also significant and the landscape may have been more rocky and sharp than it is today. The coast with rocky shores and sandy beaches is never very far away in eastern Scotland. The maritime situation is not comparable to the broken coastline of the maritime west, where the sea appears to have been central to mesolithic life, but the coast is a vital part of the eastern landscape (**6.1**). The variety of the Scottish landscape was associated with a range of environments and, therefore, a range of resources within a relatively small area. This in turn may have gone some way to ameliorating the potential seasonality of such a northern country. To journey through and around a valley such as the Tweed or the Dee was to move through a variety of environments. In this context it is notable that a preference for varied environments can be identified in some mesolithic sites.

This is demonstrated most clearly in the Tweed Valley where, in crude terms we might distinguish between the middle valley, from Kelso to Galashiels and Selkirk, and the upper valley beyond this (Figure 16-7, 67; **App. 4** for detailed review). To the east of Kelso the rich soils and comparatively homogenous landscapes of the Merse were dominated by oak-hazel-elm forest by *c.* 5000 cal BC (Tipping 1996a: 20). Throughout the middle valley however the presence of a wide range of glacio-fluvial features makes for a very varied environment (Gillen 1995: 17; Rhind 1968: 122ff). Moving upstream from the Merse soil quality declines, for example Hobkirk association soils, derived from old Red Sandstones are important from Kelso to St Boswells and the Eildons, but upstream from here soils of the Ettrick association dominate. As the valley begins to narrow the topography is broken by low to moderate hills with occasional high, rocky summits. This is a diverse landscape notably marked by deglaciation – even after several centuries of improvement varied mosses and muirs feature in place names. This area is diverse today: 'this wide variation of natural landscape provides a habitat for an astonishing number of birds and animals and is a source of delight to human native and visitor alike' (Omand 1995: xiii) and it is likely that the ancient landscape was also a rich environment, with many wetlands and not such dense woodland as areas like the Merse. There are presently no detailed palaeoenvironmental studies of this area although pollen cores from the Cheviots indicate considerable edaphic and topographic variety in woodlands.

The known distribution of mesolithic material in this landscape is extensive. Because of a long history of collection in the area, and the comparative absence of modern research it is hard to be confident of many details, but a general picture is apparent. The larger scatters often to sit at river junctions or near the river (Lacaille 1954; Mulholland 1970). Rink (Mason 1931; Haley 1990), Springwood (Wickham-Jones n.d. a) and Kalemouth (Wadia 2000), for example are all located on high bluffs or slopes at or very near to major river junctions. The first two are located near very productive salmon fisheries. Large collections exist from these sites, which include a wide range of tool types, hammerstones, anvils, some exotic raw materials and remarkable artefacts including waisted pebbles (**5.3**) and coarse stone tools. Philliphaugh, at the junction of the Ettrick and the Yarrow is less well known but may be a similar kind of site. Further assemblages are known from Dryburgh Mains (Corrie 1916; Callander 1927) which does not sit at a river junction but on wide haugh lands underneath steep slopes. Finds are made from areas of the haugh and two restricted areas on the plateau above the site, separated from it by steep slopes.

There are further indications of the importance of the river; Lacaille, for example, records 'some half a dozen minor sites from which (microlithic) specimens have been recovered, principally near the river' (1940: 61) between Kelso and Selkirk. Other finds come from some distance from the Tweed, for example Westruther and many sites are some distance from any river although they are often near mosses or lochans. Fairington and Muirhouselaw for example are some 3-4km away from the Tweed. On the steeper hills surrounding Selkirk (on the edge of the middle and upper Tweed) Mason records a number of sites; commenting that they

> 'occupy the bleak moorlands to the south and east of Selkirk ... and present the same features of bare hill tops broken here and there by little marshes or lochs' (Mason 1931: 114-5).

In this area then although the river is important it seems likely that mesolithic land use was extensive. This may be associated with a potentially varied woodland environment with factors including relief, ice wastage landforms and ongoing geomorphic processes contributing to a much more broken woodland than characterised the Merse to the east.

In the upper valley it is harder to assess the characteristics of settlement. Many sites sit near the river, Manor Bridge for example is located at the junction of the Tweed and Manor, an important salmon pool. Trial excavations on the site have identified a pit that contains burnt hazelnuts, an enigmatic stone feature, as well as an extensive stone tool industry (**App. 2.3**; Figures 211-250). Other sites such as the Dookits (**App. 2.1**; Figures 251-261) or Neidpath Haugh (**App 1.2.28**) are in similar locations. But finds are known from other contexts, for example poorly recorded mesolithic material from Minch Moor to the south of the river (LSP). Stay finds of microliths are known from the slopes of Kittlegairy Hill and from some distance from the river at Crookston (**App. 1.2.21, 1.2.5**; Figure 324). A small site like Edston 2 is positioned *c.* 500m away from the junction of the Rivers Tweed and Lyne, on a hillside knoll (**App. 2.2**; Figures 264-270). Further upstream still small blade dominated scatters found near chert quarries may indicate gatherer-hunter use of these sources in the hills (**7.3**). Microliths have also been found from high in the Yarrow Valley, near St Mary's

Loch. It is harder to interpret this range of data which is clearly a product of the history of research in the area; it also suggests that the river was not the sole focus of activity. This would also have been a diverse environment, especially given ongoing river processes and future research will most likely demonstrate a fuller range of sites.

In the Tweed Valley then we can see a more extensive pattern of gatherer-hunter land use than is presently demonstrable in the northeast. I believe the potential variety of the woodlands in the Tweed Valley may have been a significant factor in this distribution. In this sense the distinction between the two areas is surprising, as woodlands in the northeast are also likely to have been diverse, indeed, they may have been a little lighter. Further research is badly needed to more accurately characterise the extent of settlement, but it seems likely that homogenous woodland would not have provided an ideal environment for a gatherer-hunter. Indeed one reason for the comparative absence of mesolithic artefacts from the Lunan Valley (**App. 4**) and region may be related to the generally softer topography of the area. Although gatherer-hunters were certainly present in the Lunan it is arguable that they did not create large defined *sites* over the long term in the same way as gatherer-hunters in some of the larger river valleys did. Short-term settlements are probably to be found in the area but these are difficult to identify without intensive fieldwalking campaigns. Unfortunately David Henry's intensive collections but are from an area where extensive later prehistoric activity (early neolithic through to bronze age) has created complex palimpsests of material. It is interesting that his finds suggest the importance of lochs and lochans, but in the absence of a larger comparative sample it is difficult to interpret this.

Overall then the evidence we have for patterns of mesolithic land use in eastern Scotland is not straightforward, especially given such a problematic sample. However broad patterns are apparent, and it is interesting that regional differences can be identified. In the northeast rivers appears to have been very important, providing the main focus for settlement. In the Tweed Valley although the river is important there are indications of a much more extensive use of the landscape, perhaps because this was cloaked in quite varied woodland. The coast also played a part in the settled landscape but was not dominant (**6**). It is not possible to assess the reasons for the significance of rivers. In any case, it is difficult to make this evidence fit any simple model at this stage, and the impression is of considerable variability that we are only beginning to understand.

3.3.2: Time and the landscape

As well as considering the extent of landscape use it is also necessary to consider the temporality of gatherer-hunter settlement. Whilst it is difficult to assess the duration of occupation at many sites it is possible to say something about the endurance of some locations into the *longue durée*. Vast collections of artefacts from sites such as Rink or Dryburgh for example seem likely to indicate the use of these locations in the long-term during prehistory; at time scales well beyond those of individuals. These are well located sites, which may have seen repeated, if discontinuous visits. It is possible that these took place in conjunction with salmon runs, when an abundance of food might allow a large gathering to be fed. Other, smaller sites also appear to have had a long term significance, Morton, for example, was utilised discontinuously throughout the mesolithic, and arbitrary decisions about where to deposit shell debris on this small outcrop remained very constant in this period. It therefore seems likely that some parts of the mesolithic landscape were old locations, often returned to. Whilst in part this may encapsulate some of the 'tethered nomadism' discussed by Binford, it is more interesting in terms of social relationships with space and place that these long-term locations were likely to have been important, named reference points; most likely an important part of story and legend.

In the Tweed some of the big riverine sites are rather fuzzy. Near Rink for example, although detailed find-spots are missing, microliths are found on many adjacent farms (**App. 3.1.6**) whilst at Manor Bridge blade core industries are found on both sides of the river at this important junction (**App. 1.2.24-26**). Many other riverine sites are difficult to interpret, but in some instances it seems likely that we are dealing less with a fixed site, and more with a significant location, such as a river junction and the actual habitation or activity may have shifted a little over time. This slight fuzziness is in sharp contrast to Bradley's findings in Strathnairn where mesolithic land-use is argued to have produced well-defined sites (2000b). Small well-defined sites are also known in the Tweed, for example at Edston 2, and many of the coastal sites in the east are also small scale, or well-defined (**6**). Without attempting to interpret these sites in terms of function it is clear that there is a distinction between oft-visited sites, with a long history of use, and sites that are completely new and only occupied briefly. Of course, this distinction is not absolute, and sites such as Shiplaw in the Eddleston Valley, arguably an occasionally visited location, demonstrate that our categories will always refuse easy resolution, but when considering gatherer-hunter movement we should also take into account the varied temporal associations of these places.

Mesolithic settlement would also have been closely interwoven with a series of temporal rhythms from the short to the long-term. Northern latitudes are marked by a seasonality of resource availability, and winters in particular can be harsh. Often, accounts of seasonality have simply stressed resource availability, as for example in Mellars' account of red deer movement. Resource availability was certainly significant, and a number of important resources are likely to have been seasonal, such as anadromous fish or migratory bird species, and plant foods. Although it is difficult to assess the significance of seasonality for storage or bad winter economics it is likely that occasional seasonal abundances were important in structuring temporality. Such moments may have provided contexts within which larger gatherings could remain in one place without exhausting the resources of the area. In this example the rhythms of social life and community are interwoven with those of the wider landscape.

The varied 'tastescapes' of the seasons would have been closely caught up in rhythms of growth and harvest and would have provided one of the fundamental ways of structuring the personal and communal experience of time. For example the Achuar, small-scale horticulturists of the Upper Amazon call the period from November – April the 'time of the wild fruits', whilst March is the 'time of the fat of the woolly monkey' and September – January is the ' time of the fish' (Descola 1997: 138-139). In a similar fashion the pygmies of the Ituri forest celebrate the honey season (Turnbull 1993: 237). Living in a predominantly deciduous environment would have had further impacts on the experience of time and seasonality. One characteristic of woodlands for example is the vernal period, a short period of time in early spring when ground shrubs and grasses flourish before leaf cover blocks out their sources of light – the most famous example would be the dominance of bluebells in contemporary woodlands. Vision and mobility in deciduous woodlands would also be closely linked to the seasons. Rivers will also have been seasonal, running in spate in spring for example, but lower in autumn. This in turn may have had effects upon mobility. All these factors are difficult to assess in detail, but they are suggestive of important seasonality in the experience of the mesolithic landscape: mobility and economic activity were distinctively temporal activities.

As well as short-term or seasonal rhythms it is important that long-term changes in the environment are considered. These are addressed in detail in Ch. 5, but the climate and environment did not develop in a single trajectory but were characterised by flux at a number of time scales. For example, cold periods occurred, sometimes lasting considerable periods of time (**5.1**) and changes took place in the dynamics of forest communities. As well as climate change environmental change was significant at a number of other levels. Sea level change could be rapid, particularly with the long shallow off shore topography of the North Sea plain (**6.1**) and events such as the tsunami of *c.* 7000 BP must have had significant localised impacts. In this context it is inappropriate to look for rigid patterns of human movement over time throughout the mesolithic period, especially given the extent of variability that characterises gatherer-hunter movement at a number of time scales in ethnographic contexts. From an analytical perspective we might stress the flexibility that must have been central to the success of these communities in a long-term ecological sense. However we must not forget that the decision making process was smaller scale, concerned with the identification of resources given a set of understandings about the environment, rather than with abstract systems. In the face of two decades of cold different choices were made by people, and different journeys through the forests were certainly woven. Ecologically this is sensible, flexible behaviour: in terms of human practice and historically situated decisions it is the manifestation of agency within particular contexts. It is this flexibility that may have generated much of the variability that characterises the data set. No two occupations of an area were the same (see **6** for examples) and sites occupied for different reasons may have utilised different aspects of a suite of available material culture.

At a variety of levels mesolithic mobility and economic practice created a series of temporal associations and rhythms for social life. Such associations would have provided a particularly significant context for social relations of all kinds. For example, most relationships were probably based around the face-to-face playing out of *practical* kinship rather than official kinship (Bourdieu 1977: 33) although official, institutionalised categories may have been more important in certain times, or in certain places. Because of the character of these rhythms and the vagaries of the material record it is often difficult to understand these phenomena in detail. However they would have been central to the experience of the mesolithic landscape and should be included in our accounts of the period.

3.4: Review

Although definitively establishing the character of mesolithic mobility, economic practice or social relationships is impossible some comments can be made about the characteristics of these historical phenomena and this provides a vital context for the case studies that follow. Most models of mesolithic society in Britain are not appropriate for a social archaeology of the period and, in any case, offer a poor fit to the data we have available. The surviving material culture does not imply rigid patterns of land use, but is indicative of some flexibility and of a generalised rather than narrowly specialised economy. Varied rhythms of movement and economic practice created a series of temporal rhythms, or taskscapes, that were a vital context in which social relationships could develop. It is not possible to characterise these relationships at a general or abstracted level, but only by reference to particular uses of material culture in certain contexts. It is the exploration of these varied dialectics that form the basis for the case studies that follow.

Part 2: Contexts

'There is a kind of natural magic in landscape. The concrete traces of human experience enliven any terrain marked by human passage, however transient that passage may have been. Place names, paths, signs of habitation; the sense of space as formerly known or occupied (even if the presumed occupier is, today, unknown), an awareness, perhaps illusory, of the pulses of life and events that once animated an otherwise vacant terrain ...

What I mean by natural magic: the sense that there is always another story embedded - slightly askew – just beneath the surface of the story that is being told'
(Steedly 1993: 147)

Chapter 4: Woodland histories, histories of woodlands

> 'Our project must be to locate a nature which is within rather than without history, for only by so doing can we find human communities which are within rather than outside nature.' (Cronon 1983: 15)

The varied wooded landscapes of eastern Scotland were vital to social reproduction in the early Holocene. As well as providing resources, woodlands are often the locus for identity and understanding for modern wood dwellers. Therefore woodlands may also have been significant in the past and it is not acceptable to dismiss them from our analyses as the 'surface' or 'skin' of the land.

In the first part of the chapter I address the character of the wooded landscapes of Scotland, outlining a history of environmental and climatic change and discussing the characteristics of natural woodland. Secondly, I examine the dominant framework by which archaeologists describe the interactions between mesolithic populations and woodland; active, purposive management of the woodland environment. I believe that although we have *some* evidence for disturbance of woodlands, this does not equate to the managed system described by many commentators. Finally, I outline some other ways of considering the relationships between woodlands and people.

4.1: Histories of woodlands

4.1.1: Methods

Reconstructing environmental and climatic history relies on a number of investigative procedures – from examining plant macrofossils from archaeological contexts to analyses of the chemical composition of the Greenland icecap. However the dominant approach has been palynology, and some discussion of the method is appropriate (Kenney 1993; Roberts 1989: 22-28; Tipping 1994).

Pollen cores are not a direct record of the past environment but a basis for the interpretative reconstruction of the pollen-rich environment in the past. Pollen is produced differentially by varying species and enters preserving sediments by a variety of mechanisms. Consequently the pollen in one sample can come from a wide catchment area and due to different mechanisms of pollen dispersal species representation is not straightforward. Difficulties exist in identifying species; for example, it is difficult to differentiate cultivated cereal pollen from wild grass pollen. Pollen quantities in a sample therefore require interpretation in order to reconstruct the ancient environment even before any identification of causal factors is made to explain the patterning observed. Indeed, the difficulty of differentiating natural and human impacts on woodland should be stressed, especially in the context of changing understandings of climate change (see below). For example, claims that palynological data demonstrates mesolithic occupation of the Outer Hebrides and Shetland (Edwards 1996b; Bennet *et al.* 1992) have been criticised by Tipping (1996a) who suggests that changes in woodland structure are more significant (see also Macklin *et al* 2000). These particular debates will run, but Tipping's observation is important:

> '... the comparative abundance of Mesolithic activity recorded on pollen diagrams from Scotland ... can only indicate either an astonishingly high population, or, more likely, that not unexpectedly we are confounding artificial with autogenic deflections and processes' (1994: 16).

4.1.2: Environmental and climatic history.

For most of the last century environmental analysts made use of descriptive shorthands in order to represent temporally phased climatic reconstructions, simplify variable palynological data and facilitate regional comparisons. These phases trace the supposed evolution of the climate and vegetation from the Lateglacial (Figure 68).

These models supposed that the Pre-Boreal was a period of initial vegetation reaction to slowly ameliorating post-glacial conditions; the landscape dominated by open-ground taxa, including juniper and dwarf birch. The Boreal saw continuing amelioration towards 'climatic optimum' and the slow rise to dominance of woodland, initially represented by birch but becoming fuller over time. The cooler, wetter Atlantic period saw closed-canopy 'climax' woodland; the supposed stable, natural 'primeval' forest of northwest Europe. The dominant tree types through most of northern Britain were believed to be oak and hazel, except in the extreme north and the Highlands (a major exception in a Scottish context). The widespread elm decline and the increased environmental impact of neolithic cultures marked the end of the Atlantic.

Recent approaches to forest dynamics and climate change suggest that these rather standardised outlines obscure important variability on a number of levels and must be abandoned. Models stressing climax woodland emphasise ecological equilibrium and stability rather than dynamic process (Peterken 1996). Such accounts therefore:

> 'tended to remove ecological communities from history. If all ecological change was either self-equilibrating (moving towards climax) or non-existent (remaining in the static condition of climax), then history was more or less absent except in the very long time frame of climatic change or Darwinian evolution.' (Cronon 1983: 10)

This exorcism of contingent history from ecology is not appropriate for any attempt to understand either social reproduction in the past *or* ecological relationships.

4.1.3: Changing climates

Recent accounts of Holocene climate stress that traditional indicators, such as woodlands, are not especially sensitive markers of complex processes. New data from a range of sources, such as the Greenland icecap, has transformed our understandings of Holocene climate. One key factor is the recognition of variation over time. The Holocene may have the most complex atmospheric circulation patterns of the last 110,000 years (Mayeski *et al.* 1996: 77) and climatic or environmental changes take place rapidly, on a regional basis (O'Brien *et al.* 1998; Stager & Mayewski 1997; Tipping forthcoming).[32] In this short account it is not possible to do justice to this complexity but some important examples can be highlighted. I address only

[32] O'Brien *et al.* comment that 'this complexity in Holocene climate makes distinguishing natural from anthropogenically altered climate a formidable task' (1998: 1963). They are specifically referring to the modern debate about human climatic impact but this also has implications for our study of vegetation change in the past.

the speed of climatic change in the immediate post-glacial and the '8200 cal BP climatic event'.

Climatic amelioration at the beginning of the Holocene was extraordinarily rapid. Temperatures greater than those of today were reached within decades (Mayeski *et al.* 1996), or centuries at the most (Fig 5.1; Edwards & Whittington 1997; Tipping 1994, forthcoming). The idea of the Boreal as a period of ameliorating climate must therefore be abandoned (cf. Simmons *et al.* 1981: 82). The changing appearance of forests over time was the product of time-transgressive plant colonisation rather than climatic change alone (see below).[33] This has serious implications for our understanding of mesolithic settlement. There was no mesolithic occupation of a Boreal forest, followed by an Atlantic forest: different mesolithic communities at different times inhabited different forests.

Holocene climates vary on a number of levels, from the decade to the millennium. The most dramatic single example is the 8200 cal BP climatic event, observed initially in the GISP2 Greenland ice-core (Klitgaard-Kristensen *et al.* 1998; O'Brien *et al.* 1998; Stager & Mayewski 1997; Tipping forthcoming for review). The collapse of the Laurentide Ice Sheet led to dramatic changes in North Atlantic thermohaline circulation, and consequent climatic changes 'equate to around half the amplitude of the Younger Dryas deterioration' (Tipping forthcoming) for a period of *c.* 2-400 years (*c.* 8400-8000 cal BP, 7650-7200 BP). Temperature fell by 6±2°C in Greenland and by 1-3°C in Norway, where the climate became drier and the pine tree line dropped. In Germany, tree-rings show a decline in growth of over one-third. The 8200 cal BP climatic event is not the only variation in Holocene climate, a cold snap of lesser magnitude is, for example, recorded for *c.* 5600 cal BP (Tipping n.d.), but it is the most dramatic presently recognised.

The significance of these climatic events is not clearly understood either in terms of their impact on human communities or other ecological processes. However they may have important implications for interpretations of environment and woodland dynamics in the past, especially in the context of putative human manipulation of the environment. For example, Tipping (1996a) has argued that a shift in the dynamics of birch-hazel woodland in northern most Scotland during a long-term dry phase after *c.* 8000 BP is responsible for the evidence of burning in environmental records from the region. This brings into question the supposedly

[33] In a similar fashion radiocarbon dating has shown clearly that the appearance of alder, a traditional marker of the Boreal-Atlantic tradition, is not synchronous, and therefore does not equate to an increasingly damp climate (Tipping 1994: 10).

anthropogenic origin of microcharcoal records and minor disturbance features (Edwards 1996b).

4.1.4: Woodland dynamics.

> 'Natural broadleaved forests are a patchwork of different structures and composition' (Peterken 1996: 163)

Instead of treating woodlands as units, contemporary interpretations treat them as complex composite phenomena made up of many individual organisms and discuss flux and variation at many scales (Peterken 1996). Post-glacial environments cannot be understood by reference to movement of forest communities *en bloc*, but must be understood as the outcome of varied smaller-scale phenomena. The character of the early Holocene vegetation of Scotland at any time was determined by the location of refugia, competitive differences between tree species and 'chance' events (Tipping forthcoming). It is against this background that we must understand the environmental history of Holocene Scotland. Of necessity, most accounts of environmental change operate at a broad-brush level but we should not confuse the resolution of our data with processes that existed in the past. Spikins has offered detailed models of these processes in northern Britain (1999). She demonstrates important spatio-temporal variability at scales masked by traditional narrative structures, highlighting the potential effects of altitude and soil-type, creating a fine-grained model of landscape change. Such details are lost within accounts that discuss crude 'surfaces' (*e.g.* Edwards & Whittington 1997: 67), and must be vital to our considerations of the relationships between people and landscape.

Another important outcome of these changes in approach is the recognition that post-glacial forests were unique and that therefore we lack analogues for them. For example, present day birch forests tend to flourish at high altitudes and in cold locations, whereas in the early Holocene, because of competitive interactions, such forests existed in lowland areas at much greater ranges of temperature (Spikins 1999). This has serious implications for our use of ecologically derived models.

4.1.5: The big picture

I now briefly review the early Holocene vegetation history of Scotland, especially eastern Scotland. The data are uneven; studies tend to favour upland zones where preserving sediments have not been truncated by improvement (for one exception, see Macklin *et al*

2000). In the lowland east, Tipping's (1994) review reveals very few sites, and new studies frequently change our chronologies (*e.g.* Edwards & Whittington 1998). Recent reviews of the history of Scotland's vegetation have also excluded most of Aberdeenshire (papers in *Botanical Journal of Scotland* 1997; Bennet *et al.* 1997; Huntley *et al.* 1997; Ramsay & Dickson 1997; Tipping 1997) and the area sorely needs further research (Tipping 1994: 29)

After the Loch Lomond Stadial (*c.* 11,000-10,300 BP) initial post-glacial conditions were herb- and shrub- dominated. There are minor disagreements about the colonisation of the differing tree species after this date and the latitudinal and altitudinal extent of forest cover but the general pattern seems fairly clear. Birch arrived in 'most' of Scotland by 10,000 BP (Edwards & Whittington 1997: 66) and in the north by 9,500 BP (Whittington and Edwards 1997: 16). Tipping argues that its appearance was near synchronous over the mainland at *c.* 9,950-9,550 BP (1994: 10). Hazel appeared soon after, from *c.* 9,500-9,000 BP, possibly during an arid climatic period (Tipping 1994: 10, 1996, 1997: 153). Elm arrived at some stage after *c.* 8,500 BP (Ramsay & Dickson [1997] suggest 9,000-8,500 BP), a little earlier than oak which moved northwards slowly, not reaching Aberdeenshire until *c.* 6,000 BP, the mass of the Grampians possibly acting as a barrier (Whittington & Edwards 1997).[34] There is disagreement about the spread of elm. Tipping (1994: 10) suggests that its northward migration was affected by the Grampians, whilst Whittington and Edwards (1997: 16) suggest that it was present in the whole mainland by 8,500 BP. Regardless, it was never very common in Scotland (Edwards and Ralston 1984: 21) away from the south and southeast where it may have been significant in oak-elm woods. Pine is believed to have spread from the northwest, or possibly Ireland, expanding through the Highlands from *c.* 7,500-7,000 BP (Tipping 1994: 11). Lime was rare: Tipping argues that it was absent, except possibly in the Merse (1994: 10), Whittington and Edwards (1997: 16) argue that it was present in the eastern Lowlands. The arrival of alder, a poor competitor, is a complex, non-synchronous process (Tipping 1994: 11, Whittington & Edwards 1997: 15); human disturbance may have been important in facilitating its spread.

It is important to consider the altitudinal extent of forest cover (Tipping 1994: 13-4). Commentators vary widely in their estimates and few very high-altitude palynological studies have been undertaken. Tipping argues that in terms of forest dynamics and climate 'there seems little reason to believe that any unforested area need have existed south of the Forth-Clyde line', and that there was a decreasing tree line to the north and west (1994: 14). He cites

[34] The complexity of woodland migration, and the paucity of our understandings are evidenced by the inferred presence of oak and elm at Catta Ness, Shetland by 9,200 BP (Bennet *et al.* 1992).

figures of >700m on Beinn Lawers, and >600m in the Grampians and it seems likely that upland areas of Scotland could support relatively dense forest for long periods of prehistory. Nevertheless, we should not think solely in terms of absolute tree lines, woodlands changed character with height (Simmons 1996; Spikins 1999) providing distinctive ecotones. Different forest communities are also affected differentially by altitude – north of the Tay the oak and elm component of a mixed birch-hazel dominated woodland was very sharply affected by altitude (Tipping 1994: 29). One distinctive feature of the Scottish landscape is the proximity of topographical relief, providing a range of environments and by extension forest types within small horizontal distances, a factor that may be of some significance in understanding mesolithic settlement. Tree lines would have varied through time as climate changed, and human activity may have affected the degree of openness at woodland margins.

Peat formation is another contentious consideration, fortunately mainly beyond the scope of this review. Two main causes are adduced: climatic change or human activity (Simmons 1996; Tipping 1994). Paludification was a highly localised process, varying spatially at very small scales, as for example at Carn Dubh or North Gill (Tipping 1995; Simmons 1996). Peat formation was ongoing throughout the mesolithic and adds another important consideration to the mosaic of landscape types.

Generalised distributions of woodland types (Figure 69) provide useful overviews of the character of woodland in an area, but cannot do justice to complex local manifestations of woodland types. These were greatly influenced by local relief, soil development (see Davidson & Carter 1996), prevailing winds and many other factors, including dynamic woodland processes. It is to the latter that discussion now turns.

4.1.6: Natural woodlands

It is difficult to conceptualise the characteristics of natural forests. All of the forests we encounter in Britain are the products of centuries of management (Peterken 1996; Rackham 1986) and have complex symbolic associations (Schama 1995). Images of virgin forest tend to the dark and dramatic: the forest of *Hansel and Gretel*; the Wild Wood of the *Wind in the Willows*; or the forests of Tolkien's Middle Earth (Peterken 1996: 25ff). Natural forests are seen to be dark homogenous stands of old trees with dense, impenetrable undergrowth. Such images may have been important in structuring accounts of the prehistory of Scotland, the forested interior of which was considered to be unattractive to settlers. Piggott (1982: 10-11) describes a 'heavily overgrown' land of forests; Lacaille (1954: 66) a dense woodland, with difficult land-routes (see also Ritchie & Ritchie 1991: 11-12).

The actual characteristics of natural woodland are very different. Peterken stresses that 'the original forests … were not one unbroken massif of monumental old growth' (1996: 85) but 'contained a variety of age classes and open spaces' (ibid. 20). Natural forests are dynamic communities in which 'disturbance is an integral part' (ibid. 87). Different forces keep woodlands in a state of continual disturbance at varied scales. These include trees dying, wind throw, lightning strikes, anthropogenic activity, disease, soil processes and many other factors. In total these mean that gaps (at varied scales) are a permanent feature of the forest landscape (ibid. 197). Natural woodlands are therefore not impenetrable masses of deadwood and under-storey vegetation, although this may have been significant in some places, but are very varied, including a range of habitat and therefore wildlife types.

In early Holocene eastern Scotland in particular there were a great number of factors that contributed to maintaining a spatially complex, frequently disturbed woodland. Alongside the influences listed above, geomorphic processes and shorter-term events such as landslides, rock falls or seismic activity were significant as the landscape recovered from glaciation (Ballantyne & Dawson 1997). River profile development and terracing was another landscape-scale geomorphic process: braiding and anastomising rivers would have continually provided fresh edges for plant colonisation even as river erosion removed existing habitats. Floodplains, and light gravel soils, are highly susceptible to wind-throws (Brown 1997: 141) and are frequently foci for open spaces of all kinds (Peterken 1996: 188, 347, and *passim*). The glacial legacy was important in many other ways as well. Scotland's landscape was diverse at a local level; kettle-holes, moraines, drumlins, eskers, and derived gravels all created a great range of habitats for plants and the development of soils. Many kettle holes, for example, would have provided small lakes or mires early in the Holocene, slowly in-filled through variable hydrosere successions (Roberts 1989: 67). Sea level change would also have had a significant impact on vegetation dynamics in some areas, as indicated by the account of the Sands of Forvie (**6.4**). Beaver (*Castor fiber*) was present in early Holocene Scotland (Kitchener & Bonsall 1997: 7; see also McCormick & Buckland 1997: 87; *contra* Kenney 1993) and may have had considerable effects on woodland characteristics (Peterken 1996: 95; Simmons 1996: 130-1). We also have little idea of the potential impact of wild ungulate populations on forests (R Tipping, pers. comm.). Peterken (1996: 95) highlights the impact that bison and wild pigs have in Białowieza Forest, where they create a scatter of disturbed patches in certain forest types but this is not a directly comparable ecological situation. In passing, it is worth considering the human cohabitation of wild forests with varied animals and other seemingly active forces. How did mesolithic folk relate to wolves, bears, or other animals, to wind throws, earthquakes or flood? The answers to these questions are likely to remain obscure, but an interpretative archaeology of the mesolithic period must still ask them.

These factors suggest that far from being a homogenous dense forest Scotland's woodland landscape was characterised by a reasonable degree of diversity, including a number of open spaces, particularly in riparian contexts. It should, however be noted that many diagrams from lowland Scotland (such as those from the Central Belt, [Ramsay & Dickson 1997: 145; Edwards and Whittington 1998]) have fairly low proportions of herbaceous pollen. I would argue that this was not due to rigid closed-canopy woodland but is partly an outcome of the greater production of pollen by trees than shrubs and the aggregate chronological resolution offered by palynological data.

Scotland's woodlands changed as part of a number of cycles ranging from the seasonal, to the lifetime of the plants involved, through to the longer chronology of climatic change. Amongst these rhythms of change were woven human lives and it is against this complex background of spatial and temporal variation that we must study the possible relationships linking people and forests.

4.2: Woodland histories

4.2.1: Clearing the land

A characteristic feature of mesolithic pollen records in Britain are 'disturbance episodes'; changes in the representation of different species that are difficult to understand in terms of a natural succession of plant communities. They often take the form of temporary, small-scale reductions in arboreal pollen and are assumed to reflect some kind of human clearance or interference with natural vegetation. These episodes have been recognised since at least 1960 (Simmons 1996: xii), and since the 1970s have been interpreted in terms of active forest management (Jacobi *et al.* 1976; Mellars 1975, 1976b; Simmons 1983). Such accounts argue that the maintenance or creation of clearings produced appreciable ecological benefits, especially for ungulate populations, which mesolithic groups were argued to have close relationships with (Chaplin 1975; Evans 1975). Mesolithic populations were linked to the active manipulation of hazel, ivy and elm (Simmons & Dimbleby 1976; Smith 1970). Evans described mesolithic man (sic) as a 'redoubtable fire raiser' (1975: 46) and Simmons *et al.* believed their influence was 'extensive' (1981: 103).[35] It is arguable that the popularity of the concept of management in the 1970s was connected to a desire amongst researchers to identify mesolithic populations that were actually *doing* something significant.

Today, forest management is still the dominant interpretative trope for the relationships between mesolithic communities and the woodland environment; for example recent accounts highlight the significance of forest alteration (Moore 1996; Simmons 1996) or raise the possibility of extensive plant husbandry (Zvelebil 1994). The model is embedded in many introductory texts, often with the assumption that these activities are extensive. Halliday, for example, argues that the evidence for the use of fire in the Borders 'reflect(s) widespread activity on quite a large scale' (1995: 23). I am uneasy with assumptions of large-scale activity and the dominance of this interpretation, which, to my mind, overemphasises the extent of these activities and conceptualises the relationships between people and space in an inappropriate fashion. The background to the argument in the generalising, ecologically oriented New Archaeology of the 1970s is significant. The identification of ecological benefits accruing from burning in supposedly comparable ecological contexts in the present is taken as a template for purposive activity in the past (*e.g.* Mellars 1976b). At all stages the

[35] Simmons (1996: 150) is more poetic in expressing similar sentiments; 'a golden eagle in the years 8000-5000 BP would at some time of the year have looked down on a landscape with a number of fires burning in gaps in the forest'.

perspective of the totalising analyst is maintained and the possibility of understanding the past in different terms to the present is denied.

Simmons' account of the '*Environmental Impact of Later Mesolithic Cultures*' (1996) reviews English and Welsh data drawn from upland areas from Dartmoor to the Cheviots, with detailed discussion dominated by the North York Moors. Simmons believes that the Scottish Highlands are too different to be included in his review but implies that southern Scotland should be included (1996: 2). He draws on a database of 58 upland pollen cores to characterise disturbance episodes, concluding that (1996: 61ff)

- forest disturbance took place in a landscape where fire was a common feature.
- oak often suffered most from disturbance, birch and alder also often declined, birch and ash were more likely to improve
- hazel may increase greatly, but in some episodes suffers
- grasses may replace trees/shrubs but heather/bracken may colonise

In general Simmons' conclusions look sound, but the percentage figures he uses to claim that fire was a frequent feature in disturbed landscapes do not match the data offered (Simmons 1996: Table 2.2). He claims that 74% of disturbances were associated with detectable layers of macroscopic charcoal (ibid. 60). However the data in his table suggest that macro-charcoal was observed to be present in 22 cores, and observed to be absent in 21 (the other 15 records are not commented upon). These figures *combine* to 74% (43 from a sample of 58) but the implication of the data is that charcoal is present in only 22 of 43 episodes (51%). Similarly his observation that micro-charcoal was present in 50% of cores can only be achieved by combining his figures for the observed presence (14%) *and* absence (36%) of microcharcoal. These figures change the confidence with which fire and disturbance can be associated, although there is still an association (although that for micro-charcoal is very weak). It is also not clear whether these fires are autogenic or anthropic.

Drawing on 4 sites in more detail[36] before looking more widely, Simmons identifies an 'A-B-C' sequence of disturbance

A: 'Intense disturbance of local woodland' (1996: 70), often with fire, over long periods of time
B: stable phase with some occasional interruptions in the dominance of tree pollen
C: increased disturbance

[36] Black Lane Brook (Dartmoor), Waun Fignen Felen (South Wales), Robinsons's Moss and Soyland Moor (both Central Pennines) (1996: 62)

He argues that these periods are not synchronous and therefore reflect anthropogenic activity rather than any ecological process. In fact, ecological processes can operate non-synchronously ([redacted] Tipping, pers. comm.). The remarkable analyses at North Gill add focus to Simmon's discussion. He suggests that 'disturbed vegetation was of the order of tens rather than many hundreds of metres in diameter' (1996: 86) and that disturbances lasted hundreds of years not thousands (ibid. 103). He also identifies different types of clearance, including leaf lopping. Simmons argues that forest disturbance is important throughout the mesolithic, beginning in the early mesolithic. Simmons highlights events that took place before the development of extensive woodland and in conifer woods (1996: 75), arguing that disturbance with fire did not take place exclusively in deciduous woodland or at the forest edge (although these were the most frequent locations in which disturbances were made). He suggests that the upland locations are often near lakes, or in the zone between the hilltops and the spring line, or at the spring line (1996: 107).

He discusses a range of possible models for mesolithic settlement, drawing heavily on a basic upland-lowland dichotomy whilst stressing the importance of the coast, arguing (1996: 154) that the palaeoecological patterns are best understood as part of the following narrative:

> i) mixed oak upland forest with some natural disturbances
> ii) these attract herbivores, suppressing vegetation. Humans note these concentrations and attempt to maintain them
> iii) fire used to maintain openings in oak forest. Attempts to produce these openings in alder forest
> iv) climate change predisposes scrub to be replaced by heath-land vegetation
> v) increasing pressure (from population growth or 'resource-hungry groups' [1996: 154]) leads to the creation of 'extra openings' by killing trees by ring barking and removing leafy branches to use as animal fodder.

Simmons argues that the mesolithic therefore saw long-term changes in the relationships between humans and the environment (1996: 222ff). The later mesolithic was characterised by 'widespread management of woodlands' with the 'creation and maintenance of human-induced open areas at a landscape scale' (1996: 224-225). Simmons believes this was purposive behaviour, and therefore, that to be mesolithic involved consciously manipulating the environment in which you live.

> 'this is a pivotal moment comparable to the discovery of the full potential of steam power, for example: the redirection of the energy-flow patterns of the earth in terms of human-defined, *i.e.* cultural, desires.' (Simmons 1996: 225)

Simmons' analyses are wonderful reconstructions of the detailed history of North Gill but I believe there are problems with the conclusions he draws from the wider data (some have already been noted). His models reveal important conceptions underlying the supposed 'management' of the woodland environment. These mesoliths are a 'resource-hungry' folk (1996: 154), concerned with maximising returns and with clearly defined cultural desires that operate upon the natural landscape (see quote above). His account is based upon ethnographically observed behaviour in the present and modern divisions of human experience into the realms of nature and culture. In this sense his mesolithic populations inhabit a generalised landscape rather than a specific historical one.

Recent accounts of woodland disturbance may stress the fairly small-scale character of disturbance and raise some questions about whether this disturbance was anthropogenic or autogenic, but many of the basic assumptions underlying the models of the 1970s remain. These include the ideas that ungulates form the basis of the economy (*e.g.* Bennet *et al.* 1992), that population or resource pressure were an important factor in driving improvements in the forest environment, and that human activity is defined in opposition to woodland (see Tipping 1994: 5-9). Finally, these models also assume that managing woodlands was self-evidently desirable, and that given the choice, skill or knowledge, gatherer-hunter groups would do so. However, there is no real basis for these assumptions.

Finally, whilst 'management' is a recurrent theme in these accounts this rather ambiguous word has been utilised carelessly. Zvelebil discusses the distinction between conservational and promotional land use, both of which are often encapsulated in the word management (1994: 59). The former involves 'culturally sanctioned restrictions of resource use ... through spatial, social and economic strategies' (ibid.) such as movement between hunting and foraging grounds and deliberate culling strategies in order to maintain a stock. Promotional strategies involve the active manipulation of resources in order to increase their productivity. These practices lead to serious difficulties with analytical use of the category of 'domesticated' resources (1994: 60). It is arguable that most discussions of mesolithic land 'management' have conflated these meanings, whilst tacitly assuming the second. However given the coarse-grained data, the relative paucity of our understandings of the dynamics of Holocene environments at the local scale, and our failure to understand social factors influencing the deposition of 'storage' material (**8.6**), it may be very difficult to clearly distinguish between conservational and promotional strategies. My suspicions are that in the east much activity was smaller scale, aimed at conserving resources and relationships rather than actively promoting their growth and that this should not be understood through the metaphor of 'management'.

4.2.2: Data review

Several commentators have suggested that pollen records from eastern Scotland can be interpreted in terms of disturbance episodes. In southern Scotland for example, Tipping describes the evidence for woodland disturbance as 'substantial' (1997: 153), whilst Innes & Shennan comment that 'Mesolithic man (sic) evidently influenced Flandrian forest patterns ... at least locally' (1991: 27). Ramsay & Dickson comment that there is some 'equivocal' evidence for human impact in central Scotland (1997: 145).

Zvelebil argues that in Europe generally 'palynological evidence lends tentative support for human manipulation of the landscape in a pattern which would benefit plant husbandry.' (Zvelebil 1994: 55) claiming that ten sites in eastern Scotland show evidence of disturbance. These sites, along with some details of more recent investigations have formed the basis of a review of the palynological data. This review is not comprehensive, but demonstrates the range of data available. The sites Zvelebil discusses do not clearly demonstrate anthropogenic forest disturbance, but some recent analyses are more suggestive of these processes.

The sources are variable. Many are 'old' sites with sampling resolution problems; 10cm samples were utilised at Side Moss and Drumochter (Newey 1967; Walker 1975), greatly limiting their potential use in this context. Many sites also have few or no radiocarbon dates. For example shallow peats from an abandoned stream channel sealed by topsoil containing mesolithic flints at Nethermills, Aberdeenshire (Edwards & Ralston 1984) revealed some evidence of disturbance – a fall in birch and *Filicales*, contemporary with increases in *Plantago lanceolata* and *Umbelliferae*. However without an absolute date it is impossible to relate this episode to the mesolithic period despite the presence of mesolithic structures nearby (Kenworthy 1981).[37] Undated peat from Kingsteps Quarry, Nairn yielded mesolithic artefacts, lenses of charcoal, birch and hazelnuts but the association between the evidence of disturbed vegetation and the lithics material is not clear, nor is the reason for the disturbance (Edwards and Ralston 1984).

In other instances disturbance episodes may result from natural processes. At Alt na Fiethe Sheilich (Birks 1975) there are steep fluctuations in the relative proportions of trees and herbs during zones AFS3 and AFS4, predating 6960±130 BP. The first takes place within birch- and hazel-dominated woodland and sees a rise in wetland plants; this may represent little more than increased paludification of the area. In AFS4 heather increases whilst birch declines sharply (birch was slowly declining anyway). This pattern is hard to interpret, as rises in heather are also common at Loch Einich (Birks 1975) and may be due to larger scale processes. Birks noted no anthropogenic activity at either site. At Loch of Park, Aberdeenshire a slight decline in elm in Zone VIIa is accompanied by the appearance of non-tree species and has been cited as evidence of mesolithic impacts. However pine rises at this time and the change may reflect regional vegetation patterns (Edwards & Ralston 1984).

A number of studies have identified anthropogenic disturbance episodes during the mesolithic period. At Dod, near Hawick, four disturbances are recognised on pollen cores from *c.* 200mOD (Innes & Shennan 1991). Not all are considered to be anthropogenic but two are clearly important. The first, at *c.* 8,500 BP, sees a reduced woodland density, ruderal indicators and increased alder and sedimentation. There is another possible disturbance at *c.* 8,000 BP before a major event at *c.* 7,000 BP when dense wood cover, including oak, hazel and alder, falls. Disturbance has also been observed at Yetholm and Sourhope, mainly post-dating *c.* 6,500 cal BP. At the latter a lengthy (*c.* 1,500 years) clearance episode, possibly associated with fire, began at *c.* 6,575 cal BP (Tipping 1996b: 23). However the picture is varied, recent studies at Rae Loch (Edwards & Whittington 1998) demonstrate few indications of woodland disturbance; no evidence of coppicing, or leaf-foddering, no microcharcoal and very low rates of sedimentation throughout the mesolithic (10,000-5,220 BP, RAE2-RAE4).

The evidence for forest disturbance in the east of Scotland during the mesolithic therefore varies significantly. In part this reflects the varied data sets available, more recent work is identifying these processes at greater levels of sensitivity, but some general observations can be made. Although there are clearly some episodes of fairly substantial reductions in woodland cover, such as at Dod (Innes and Shennan 1991) and Sourhope (Tipping 1996b) there is little evidence for deliberate clearance on any large scale or in the long term. Tipping observes (1997: 153) that in the Southern Uplands disturbance covers a range of environmental types at a number of scales, and that there is no simple explanation for these data. Fluctuations affect different species, in differing locations and there is no clear association between particular events and the presence of microcharcoal or other fire indicators, except for a very weak link between microcharcoal and alder rises (Edwards 1990).

There are suggestions that the extent of disturbance varies between regions, but it would be possible to make too much of this given the varied data and the lack of recent research in the

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[37] Charcoal in archaeological contexts from Nethermills is dominated by oak.

northeast. The majority of our evidence for woodland disturbance does come, broadly, from the south, rather than the northeast. It is certainly conceivable that the woodlands of this latter area, in which oak and elm never played a major role, did not witness the same types of activity as the Southern Uplands (which, ecologically speaking, had more in common with northern England)[38]. There are hints that the amount of woodland disturbance increases towards the end of the mesolithic period. The data from the Borders is best known, and shows activity after 6,500 Cal BP at Sourhope and Yetholm (Tipping 1996b), as well as possible disturbance at Linton Loch after *c.* 6,500 BP (Mannion 1978a; 1978b). Clearance at Dod is more variable in date, beginning at the very opening of the later mesolithic (*c.* 8,500 BP). Away from the Borders, at Braeroddach Loch, Aberdeenshire, '[t]he very end of the period is marked by some evidence for small-scale anthropogenic activity, as indicated in particular by an absolute decline in tree pollen' (Edwards & Rowntree 1980: 218).

It has been argued that in Scotland,

> 'it is a possibility that the largely closed mid Holocene woodland, prior to its reduction at the *Ulmus* decline, was in fact, at least at the local scale, a managed system, featuring coppicing, leaf foddering and foraging' (Edwards & Whittington 1997: 73)

This argument implies a 'promotional' strategy, and an active role in controlling forest resources. Indeed some careful control of forest resources was undoubtedly significant during the mesolithic period. The manipulation of hazelnut resources is probably implied by the large quantities of hazelnuts identified at Staosnaig, Colonsay (B Finlayson, pers. comm.). But Edwards and Whittington's comment is not clearly vindicated by the palynological data form the east, nor by studies of charcoal from archaeological contexts at Nethermills, which, despite the dominance of oak charcoal, revealed no evidence of forest management (Boyd & Kenworthy 1992). We should be wary of these assumptions of management.

The varied palynological data does not tell a simple story, and will be transformed as more work is undertaken. However at this stage it does not fall comfortably into the models developed by commentators such as Simmons, although it should be noted that little palynological research has been done in comparable upland locations. Human activity did have environmental effects during the mesolithic but it would appear that this is not on the scale indicated in some texts. Recent studies in the Oban area concluded that there was very limited evidence of environmental impacts by mesolithic populations (Macklin *et al.* 2000:

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[38] Certainly Simmons model of mixed upland oak forest as the basis for disturbance patterns (1996: 154) is not applicable to this area.

113) and also indicated the difficulty of differentiating natural and humanly induced environmental change, suggesting that a much more parsimonious interpretation of much of our data is appropriate. In any case, the character of the fluctuations present in eastern Scotland, even if taken to represent anthropogenic rather than autogenic processes, may be indicative of a complex range of actions, and assessing motive for these phenomena is very difficult. There are suggestions that, in places, mesolithic activity led to alterations in woodland composition but it is not clear that this equates to a consolidated pattern of landscape management. I believe these data indicate a more flexible and varied use of the landscape.

4.2.3: Opportunists

As Tipping observes, many models of mesolithic land-use create an opposition between human activity and woodlands (1994: 5-9). Our accounts have often supposed rather monolithic forests, where human activity is only identified at the expense of trees, rather than looking for the practical interplay of humans with the wooded world in which they lived. In an excellent study, Brown has reconsidered the evidence for the mesolithic-neolithic period in southern Britain. He argues that 'purposive deforestation' has dominated our accounts of the early neolithic and that a 'fragmentary narrative' that stresses local processes and opportunistic, variable, strategies is more apposite (1997: 143). Brown argues that, notwithstanding the experimental evidence that it can be done on single-standing small trees, clearing mature forests without metal axes is 'intuitively difficult' (1997: 135). He believes that woodland use in this period is more opportunistic than we have often accredited, utilising the presence of clearings. Once a human presence was established in a clearing it could be maintained, either inadvertently, through management or grazing, or quite deliberately, through removing re-growth. Comparable arguments have been made about the use of wind-throw hollows in Cambridgeshire in the neolithic (Evans *et al.* 1999).

The framework is not without problems. Clearance of forests without metal axes would be facilitated by greater numbers of people, and can only be understood in relationship to motive; neolithic timber enclosures such as Meldon Bridge (Burgess 1976) involved a vast amount of wood. However an awareness of the role of opportunism, and the difficulty in identifying this in the palynological record is of interest in our context. As I have argued, the archaeological record suggests that patterns of movement were fairly flexible. Certain locations, especially riverside ones, appear to have been long lived; but away from these areas the topographical and environmental variation of the country is conducive to a flexible strategy. I have also suggested that the woodlands of Scotland were characterised by variety, including a range of open spaces resulting from non-predictable processes of woodland dynamics. A fairly flexible, opportunistic strategy would also be congruent with the bulk of the environmental data. The evidence from Sourhope, for example, could be read as the colonisation of a (naturally) burnt clearing, and its maintenance over the long-term rather than the deliberate creation of a clearing. Much of our palaeoecological evidence need not have resulted from intentional 'management' activity. For example, re-growth may have been stopped by preferential selection of young twigs for a number of purposes, from teeth cleaning, use as skewers over a fire, or as food stuffs, to the selection of more substantial growths for posts, tent frames or bows.

4.3: Metaphors and interpretations

I have argued that management is not an appropriate metaphor by which to come to terms with the relationships between gatherer-hunters and the landscape. However finding other ways of conceptualising the ways these relationships may have been conceived in the past is challenging. In this final section I discuss some interpretative approaches to the data we have, and to the experience of living in woodland.

Many modern gatherer-hunters do not make the dichotomous distinctions between culture and nature, human and non-human characteristic of Modernist thought. Instead they understand the world in terms of a 'relational epistemology' (Bird-David 1999) of nested categories of differentiated beings and forces encountered and negotiated with through an attentive sensual engagement with the world. For many modern forest gatherer-hunters action within the landscape is often comprehended in terms of shared relationships of nurture and procurement. The Mbuti (Zaire) consider themselves to be 'children of the forest', their *molimo* festival is understood as the forest communicating equally with human agents (Turnbull 1993: 72; Bird-David 1992a). The Nayaka (Tamil Nadu) conceive of the forest as parent (Bird-David 1990; 1992a), identifying rocks, river sources and trees as well as their immediate ancestors as *Dod Appa* (Big Father) or *Dod Awa* (Big Mother) and describing themselves as *Maga(n)* or *Maga(l)* (little son or daughter) (Bird-David 1990: 190).

Bird-David (1990, 1992a, 1992b, 1999) argues that such gatherer-hunters see the forest as a giving environment, where the nourishment for life is given *unconditionally*, rather than in return for favours offered. As a consequence the relationships between people and the environment are similar to those between people: these groups, she argues, have a 'cosmic economy of sharing' that incorporates not only human individuals but also many other aspects of the landscape (1992a). Ingold argues that descriptions of the forest as parent and other similar metaphors express the 'underlying ontological equivalence of human and non-human components of the environment as agencies of nurturence' (1996a, 134). Human action within the world is seen as inherently pleasurable – the ongoing maintenance of intimate relationships with a nurturing being (Bird-David 1992b: 39).

However, not all gatherer-hunters conceive these 'relational epistemologies' in terms of nurture. The Koyukon of Alaska for example, DRS gatherer-hunters in a very different environment, also 'perceive the environment as a conscious, sensate, personified entity, suffused with supernatural powers, whose blessings are given only to the reverent' (Nelson

1983: 226). However the spiritual world is generally perceived to be dominated by hostile forces, although 'humans can propitiate and manipulate natural spirits to their advantage, and humans are able to foster a nurturing environment by adhering closely to traditional codes of behaviour' (ibid. 234). Such a world-view is rather different to a 'cosmic economy of sharing'.

Moving away from gatherer-hunters, Bird-David (1990) demonstrates that for some cultivators, such as the Bette and the Nulle Kurumba of southern India, relationships with the ancestors and the environment are seen to be *reciprocal* rather than those of nurture. Here individuals and groups *obtain* favours from the environment by certain actions. The distinction is highlighted most clearly by the fact that whilst Nyaka (forest gatherer-hunters) offer honey to the forest spirits *after* collection, cultivators make offerings at the *beginning* of harvest and sowing in order to ensure the success of their actions.

Despite Bird-David's claim that 'relational epistemologies of this kind enjoy authoritative status in cultures of peoples we call hunter-gatherers' (Bird-David 1999: 78) and that these metaphors may have general relevance (Bird-David 1990) it is not appropriate to import metaphors from particular modern contexts into the early Holocene of Scotland. Not only are the details certainly misleading as analogies, the woodlands of early Holocene Scotland are not comparable environments to tropical forests. But notwithstanding the particular details of the individual beliefs, the general indications are that human activity within a landscape in small-scale communities is often comprehended in terms of social rather than mechanistic relationships. This suggests that a conception of management as the human ('cultural') intervention in natural processes may not be an appropriate analytical category for understanding how small-scale communities relate to landscapes. It is possible that the situation was similar in prehistory, and therefore that human action in the prehistoric landscapes of eastern Scotland should be considered in terms of social relationships linking people to the landscape around them.

And here, of course, is the crux of the difficulty, and one of the more divisive issues in archaeological interpretation. For at best I can argue that 'it is possible' that it was similar in prehistory. Unfortunately, for some, this will not do, and any attempt to dethrone western rationality, or 'common sense', from archaeological interpretation must rigidly, and categorically, identify logical reasons for the use of a different way of thinking about the world. There are difficulties here, for the use of modern common sense as the basic way of considering the past is deeply problematic. Not only does it risk turning the past into a mirror of the western present, but it is also unclear that an interpretation of the past in terms of nature and culture as opposed entities rather than in terms of people who understood humans to have social relationships with other aspects of the world is preferable *in any analytical sense*. The important point is not that the first is a 'simpler' interpretation, but that it is an ethnocentric and objectifying interpretation, and therefore very possibly misleading (Bourdieu 1977; also Descola and Pálsson 1994). The fact that the weight of interpretative and academic proof lies with those who would prefer a different approach to the data is a product of the history of our discipline, and is not, in any meaningful way, a product of more or less justifiable epistemologies. Of course, the risk of potentially homogenising the past through the mechanism of 'exotic' imports from the present is significant. It is for example, notable that Tilley's accounts of prehistoric Scandinavia (1996) have a 'distinctly Melanesian feel to them' (Gosden 1999: 8). Neither would it be appropriate to embed mesolithic gatherer-hunters in a golden age of harmony with their landscape. Notwithstanding these problems, it seems to me that we are required to think through the relationships between people and their landscapes critically, exploring a range of possible interpretations of the relationship between aspects of the world. This, we might hope, enables us to think *through* our data, rather than onto it.

In this particular example, rather than management as culture acting on a separate realm of nature, we might try and consider human action within the mesolithic landscape as the management of a social relationship linking people and their environment. This relationship may have taken differing forms, expressing ideas of nurture or reciprocity for example, but it is difficult for us to identify this level of detail in an archaeological analysis. I argued that one of the aims of archaeological analysis should be to open out the possibilities inherent in the past (**1.4**). In this sense I have no desire to achieve closure and identify *a* metaphor by which to make sense of the relationships between mesolithic populations and the environment. The creation of a number of alternative scenarios, mobilising different approaches in order to illuminate different aspects of mesolithic landscapes would be simple and forms an important part of opening out the interpretative possibilities of the mesolithic. It is very unlikely that we can capture the details of prehistoric metaphors but we can pay attention to what things might have been like.

Maintaining a clearing by the riverside might have been a way of maintaining a relationship with the dead or the spirits who had lived there before (on occasion their white and gleaming stone tools were found when a pit was cut to throw rubbish in). Every year the campsite was cleared as the large groups gathered for the salmon run. Stopping the thick bracken from growing across the floodplain kept relations with the spirits in order, and kept the seasons turning. Or perhaps burning a clearing came at the end of certain events, and was an act of closure for a location. Or perhaps young trees were cleared so that an old oak with important carvings would remain easily visible. The oaks might easily survive for 2-300 years, creating a 'disturbance episode' in the pollen record in the kettle hole just down-slope. Of course, to an extent people are manipulating the environment, but in many senses this is a by-product, or unintentional outcome of the actions that were being undertaken in the past. As archaeologists we have tended to objectify these processes as human management or interference with nature rather than take seriously the possibility of alternative understandings of the world. That this latter aim may require rather different categories of academic proof seems plausible.

Finally we should consider the effective relationships with time and space established by moving through a wooded environment marked, in places, by human agency: the scar of a path, debris from a fire or flint scatter, or, in places a small clearing. Mesolithic people were certainly adept interpreters of the forest they grew up within. For example, for the Meratus,

> 'The landscape is known as a patchwork not only of (these) vegetational types but also of specific places. Large, emergent trees often have individual names – not just species names – which can be used to identify particular groves and hills sides. Through foraging, travelling, and memories of old fields regrown into forest, central-mountain Meratus become familiar with a number of forest sites. As the sites themselves take on overlapping and varied social connotations, each user gains a loose sense of connection with other users past and present. Social identities in the mountains are not forged in "domesticated" villages; they take on the complexity of associations with the forest landscape as a fabric of diverse social and natural resources' (Lowenthal-Tsing 1993: 62)

In much the same way, mesolithic identity was forged in woods that were practical, symbolic resources and one of the ever-presents of life. That the relationships existing between the wooded environment and mesolithic communities are difficult to interpret is no reason to assume that our values are the most appropriate way in which to understand them.

4.4: Discussion

The woodlands of Scotland during the Holocene were not the dark forests of our imagination, but spatially and temporally varied environments. Most analysts have assumed an antagonistic relationship between trees and humans, resolved by the axe or by fire. Models of mesolithic land-management do not fit the eastern Scottish data set well and presuppose a radical conceptual division of the prehistoric landscape into nature and culture. A range of studies suggest that small-scale communities are unlikely to have understood their relationship to the wider world in these terms. We will not be able to interpret the details of prehistoric beliefs but by considering alternative scenarios, where social relationships are the primary motivation for activity, I am able to open out some of the other potentials of the evidence. In **1.2** I suggested that rhythms of labour and skilled routine were important phenomena in structuring people's experience of their world, and subsequently their socialisation and some examples of the particular rhythms of woodlands have already been presented (**3.3**). Of course, it would be false to separate the rhythms of woodlands from those of rivers or animals. The social links in the past were provided by the activities of humans and these complex patterns will weave in and out of the case studies presented in the rest of this thesis. In this sense the analyses aspire to a truly ecological understanding of mesolithic communities – one that pays attention to social relations as well as the transfer of energy between different parts of the world.

Chapter 5: Rivers and fishing

'Rises the cheering shout,
Over the rapid slaughter;
The gleaming torches flout,
The old, oak-shadowed water.
It is the leisterers cry!
The salmon, ho! oho!
Calmly it lies, and gasps and dies,
upon the moss bank low.'

(Thomas Stoddard '*The Leisters Song*', mid C19, cited Netboy 1968: 237)

In this chapter I discuss the importance of riverine fishing to mesolithic communities of eastern Scotland. This is examined at two levels: first by examining the possible influence fishing has on the character of society at a broad scale, and secondly by considering fishing in terms of social relations and social reproduction – as part of the material conditions within which people came to terms with the world.

In the first part I review the reasons that fishing initially appears to be important in coming to terms with the mesolithic in eastern Scotland. I then introduce models for the significance of this. Thirdly, I review the data pertaining to fishing, especially the waisted pebbles of the Tweed Valley. Finally a series of interpretative frameworks are developed.

5.1: Background

One characteristic of the mesolithic archaeology of eastern Scotland is a very close association between riverine archaeological sites and important salmon fishing pools or junctions.

On the Tweed, for example, an archaeological journey upriver passes many significant fishing pools (see http://www.propertyfinder.co.uk/fishing/index.html). The Junction Pool, at the meeting of the Tweed and Teviot is the most famous; commanding fees of £1700 a day in season (S Pelc, pers. comm.), and lies within one kilometre of the large complex site at Springwood. Further upstream the associations between large sites and well-known fishing beats are stronger. Dryburgh lies at the downstream limits of the productive Bemersyde and Ravenswood beats, with a range of pools and gravel beds suitable for all conditions. Rink farm, at the junction of the Tweed and the Ettrick, is where fish rest after spring until there is sufficient water to continue up either river. The association between sites and salmon pools continues at Manor Bridge, still a popular fishing spot today. A similar pattern is apparent on the Dee, where a cluster of important gatherer-hunter sites can be found at the meeting of the Dee and the Water of Feugh in the Banchory/Crathes area (Kenney 1993). Kenney notes that this area is the highest point at which net fishing was possible in the past (ibid. 230). Away from the famous salmon pools of the Tweed and Dee further associations can be noted. On the Ythan the gravel beds at the junction of the Ythan and the Little Water, the most important spawning ground on the river (Mills & Graesser 1981), are overlooked by a plateau from which a mesolithic assemblage has been recovered (Baird & Finlayson 1994). The estuary of the Ythan itself, now famous for migratory trout, is also rich in mesolithic material. The comparative lack of material from other rivers, such as the Tay or the Don is interesting but may be a product of a lack of research in these areas.

Commentators frequently link mesolithic actvitiy with salmon. Woodman noted that the distribution of sites on the Tweed, Dee and Loch Doon suggested a significant role for salmon, and that the location of Rink Farm was 'strikingly reminiscent' of Mt Sandel, where the exploitation of salmonids was proven by bone remains (1989: 23; see below). Wickham-Jones also observes the location of sites on bluffs above water, especially in salmon fishing locations (1994: 62), describing Nethermills as a 'typical fishing settlement'. Kenney (1993) and Kenworthy (1981) both discuss the importance of the Dee salmon as a spring resource.

Some kind of link between mesolithic sites and riverine locations now famous for salmon and other fish does appear to be significant and this relationship must be explored in any attempt to engage meaningfully with mesolithic lifeways. In order to do so it is necessary to consider the biology of the resource in question. Salmon are not the only significant migratory fish in Scottish rivers and discussion includes eels and sea trout.

5.1.1: Salmon (*Salmo salar*)

Atlantic salmon have a complex of names describing various stages in their life cycle (Mills 1971; McLay & Gordon-Rogers 1997; Netboy 1968). Eggs are laid in gravel nests ('redds') during spawning, which presently begins in November. Eggs hatch in spring and small *alvelins* stay in the gravel, feeding themselves on yolk supplies, before emerging as *fry* and then establishing themselves as *parr*, small fish with established feeding territories. Parr change physiologically at approximately two years old in Britain (Netboy 1968: 38). They turn silver, and when the river is in spring spate, migrate downstream. The fish are now known as *smoults,* weighing *c.* 50g. Today, approximately 10,000,000 smoults leave Scottish rivers each year (McLay & Gordon-Rogers 1997). At sea the fish gorge themselves in rich cold Atlantic waters, travelling to feeding grounds near Greenland, Rapidly accumulating weight, the fish stay at sea for one or more years before returning to their home rivers. One-year returning fish are known as *grilse,* often weighing 2-5kg. Multi-winter salmon ('salmon' or 'bars of silver') are larger; these are prime sport fish. In Scotland today 90% of returning fish are 1-2 winter salmon (Netboy 1988: 38-9). Salmon 'runs' take place throughout the year, and their timing varies from river to river (see below) but Spring and early Autumn are important. As salmon move upstream they frequently take advantage of opportunities to rest. Pools of water, outside of the main flow of the current are popular, and here the fish will wait, hiding where possible behind rocks. Pools near river junctions are very favoured locations, often incredibly rich in fish. Salmon progress upstream towards gravel-bed spawning grounds. Once these are reached spawning takes place, beginning in later Autumn/November. Once a salmon has spawned it is called a *kelt.* The majority of kelts, especially males, die.

Before leaving the rivers salmon offer very little in the way of food and it is only after time at sea that the fish are large enough to form an important resource. Indeed the size and proliferation of salmon in Scottish waters is notable; catches of 5 year old fish weighing 30-40lbs (13-18kg) are very common (Netboy 1968). Malloch (1912) recorded that the largest catch each year from the Tay averaged about 60lbs (27kg) and that net catches of 50-60lb (22-27kg) fish were frequent. The record from the Tay was a fish of 71lbs (32kg), 4'5" in length and 2'7" in girth, the largest catch ever recorded is a fish of 103lbs (47kg) from the Devon, a tributary of the Forth. These big fish are as large as small deer (Figure 70). Salmon are also present in prolific numbers. Although figures are not available for the period before industrialisation, pollution and over-fishing, the quantities caught after these processes had begun are startling. From 1816-20 on average 125,000 salmon and grilse a year were caught on the Tweed (Netboy 1968: 234) and in 1816 174,635 registered fish were taken (RCHAMS 1957). On the Tay over 100,000 fish were being taken by 1842. Even in smaller rivers large catches were made, *e.g. c.* 25-30,000 from the North Esk.

Salmon vary in quality; as once their run has begun they do not eat, relying on stores of fat and muscle. Their flesh therefore deteriorates with time in the river, especially as spawning time approaches and diseases become common: 'fish arrive at spawning grounds in bruised and battered condition, bodies lacerated and skin discoloured by fungus. They ... are much thinner than when they began their upstream migration' (Netboy 1968, 44). Therefore although salmon are ever present in Scottish waters (Barrett *et al.* 1998: 365-6) the supply of high-quality fatty flesh is likely to be tied into the timing of the different runs. However fatty fish are difficult to store, salmon eggs are also an important food resource and spawning salmon are very easy to catch (Fenton 1969). It is unlikely that we can easily map human choices directly from salmon biology.

5.1.2: Sea trout (*Salmo truttar*)

The life history of sea trout is very similar to that of salmon, if more complex and variable (Greenhalgh & Sutterby n.d.). Sea trout are not a separate species from riverine trout; the variations between the fish are solely the product of different life-history patterns (Picken & Shearer eds. 1990; Thorpe 1990). Spawning often takes place in early winter, beginning in October in the Ythan estuary for example (Walker 1997). Once hatched, parr feed themselves on insects, larvae and nymphs. At 2-3 years sea trout become distinguishable from river trout, as they become smoults and head to the sea. Smoults often over-winter in estuaries, and are called *finnocks*, *whitlings*, or *herlings*. Sandy estuarine beaches with low tidal gradients are ideal environments for this and finnocks are common in Aberdeen Bay where conditions are very suitable, but rare in the Tweed and north England where the fish mature much more rapidly (Walker 1997: 131). Once at sea, sea trout do not travel as far as salmon, but form large shoals fanning out near the coast. After 2-3 years they return to spawn. Despite some controversy, it seems likely that trout stocks return to their home rivers (Sambrook 1990). Sea trout do feed in fresh water, if only in small quantities, and this may contribute to the survival of many kelts after spawning. Large sea trout are very hard to distinguish from sea salmon at first, but rapidly assume a darker colour in fresh water. Trout are generally smaller than salmon, the record rod catch is of 20lb on the River Tweed, but can be caught in large quantities.

5.1.3: Eel (*Anguilla anguilla*)

The life cycle of eels is, in many senses, the reverse of that of salmon or trout. Eels are catadromous fish that die after spawning in the Sargasso Sea, near Bermuda (van Wijngaarden-Bakker 1989). Young eels are carried on the Gulf Stream to Europe and enter rivers as small elvers, with transparent bodies. Once in fresh water eels darken and slowly grow. Eels vary greatly in size in British waters; females may reach up to 1m in length, whilst males are only half this length. Larger eels are comparatively rare, anything over 2lb is considered a prize fish by anglers, whilst an eel over 10lbs is the 'ultimate prize' (http//www.users.globalnet.co.uk/~bpoole/eel.html). Larger eels are best caught in summer, in still and sheltered waters (Green 1948). Eel activity is tied to lunar phases and their migration in the autumn commonly takes place in interlunar periods. Eels can be up to 12 years in age at migration to their spawning grounds, a journey that might take three years. Eels do not feed on their migratory runs. Large numbers of immature eels running upstream can be taken in a variety of traps (Enghoff 1991). As well as providing food, eel-skins make very tough leather (Green 1948)

5.1.4: The significance of anadromids

Until the effects of over-fishing, pollution and river system management, eels, trout, and salmon were abundant resources in the rivers of Scotland. In different rivers and parts of rivers, varied fish may have been available at any one time but the general wealth of the resource seems intuitively apparent.

Most anthropological and archaeological discussions of anadromous fish stress the role of salmon rather than other species, reflecting the dominant images of Northwest American communities in the discipline (**3.2**). These stratified, sedentary communities seem to be the antithesis of gatherer-hunters in other parts of the globe, and the equation of the presence of salmon with 'social complexity', in all the myriad forms noted earlier, has often been made,

> 'salmon ... may be a singularly predictable and productive resource, which somehow permits or causes relatively high levels of population sedentism, density and aggregation, and possibly of social and ceremonial complexity as well. ...any region with salmon runs might be characterised by hunter-gatherer adaptations significantly different from those of neighbouring areas without this resource' (Jochim 1979: 220)

Alongside these concerns about the character of a society in broad terms I hoped that analysing riverine fishing might allow some examination of the character of social reproduction during the past. In particular the exploitation of seasonal resources appeared to offer potential for reconstructing something of the taskscape and the wider context of procurement activities. Furthermore salmon exploitation and processing is a skilled task (O'Leary 1996), and the transmission of skills across the generations should have been significant in reinforcing an agent's identity. It has not been possible to address these topics in the detail hoped: at every stage of analysis stable grounds on which to assess any kind of assumption on, for example, the structure or timing of salmon runs, has collapsed. However broad level contextual statements are still possible, and serve to highlight important characteristics of the human settlement of the area.

5.2: Review

Salmon and trout have been caught in a variety of ways using nets, spears, barriers and rod-and-line. In historical periods particular fishing techniques were sometimes restricted very tightly to geographical areas, as for example in the use of haaf and poke nets in the Solway Firth (McLay & Gordon-Rogers 1997). More widely, a variety of nets have been utilised, especially in estuarine contexts. Some of these techniques required boats, whilst 'fixed engines' such as bag-nets and stake-nets were also used. These constructed a barrier to the path of running fish on the coast or in estuarine contexts, leading them into the head or trap of the net. Barriers ('cruives') are erected full across rivers with gaps at intervals in which nets are set. This relatively simple technique is incredibly effective, threatening to make many rivers barren in the Nineteenth century (Netboy 1968: 232). Eels have been caught in complex systems of waterworks by gatherer-hunter groups in Australia (Lourandos 1997) as well as in many basket style traps. Fishing has also utilised a variety of fishing spears, the most recognisable of which are leisters, long spears with multiple prongs, each of which may have single or double barbs (Fenton 1969). (Greater numbers of prongs increase the chance of catching small fish) Leisters could be thrown or thrust and were very specialised tools, reflecting the nature of their target: eel spears for example had broad blunt prongs with lightly toothed edges in order to trap rather than spear fish (Curwen 1941). Leisters have often been associated with 'burning the water', the practice of fishing at night using a lamp held above the water. Whilst nocturnal habits may have been partly encouraged by the popularity of leisters amongst poachers, the use of lamplight rather than sunlight does minimise problems with light refraction (Fenton 1969).

From ethnographic data Jochim (1979) argued that differing extractive techniques would be utilised in differing parts of rivers. Spears, arrows and harpoons require clear water, in accessible shallows and low rapids. Weirs (using traps, dip nets or spears) need a moderate flow of low water, possibly near natural fords and low rapids in naturally narrow parts of the river, and, due to the need to sink posts, probably not in rock-bottomed parts. Larger nets require higher, sometimes murky, water, at the foot of falls or rapids, eddies adjacent to sand bars and projections of the riverbank.

Once caught, fish may require processing. This is time consuming work, and the fish must be dried rapidly. Processing may have a profound influence on the location of a settlement, the Champagne/Aishihik peoples of Yukon, Canada for example, settle in areas at the heads of river valleys where there is sufficient wind to dry their salmon (O'Leary 1996: 8). Processing techniques vary by size, sex and species of the fish. Fish must be protected from rain, insects and sunlight and are smoked in a variety of structures, sometimes very substantial. Fish-heads may be stored in pits and fermented.

In contrast to this rich range of ethnographic and historical data the archaeological evidence for salmon fishing in the European mesolithic is comparatively slight (see **5.4** below). In a British context the best evidence we have for the importance of anadromous fish comes from Mount Sandel in Northern Ireland (Woodman 1985). The site is on the east banks of the River Bann, located over important rapids. Woodman observes that the location is very similar to that of Rink Farm (1989: 23). The complex suite of structural remains defies easy interpretation but appears to be evidence of repeated, discontinuous occupations from *c.* 8950-8550 BP. A series of huts, partly constructed from sods removed from a central hollow, and partly from stakes and poles, were constructed and a wealth of inter-cutting pits and hearths are also found. Salmon and trout comprise 84% of the fish bones, eels a further 7%. Due to sampling methodologies it is not possible to establish the comparative importance of fish as opposed to mammal remains, which are dominated by pig. The site is argued to be a seasonally occupied base camp. Woodman argues that salmon and eel runs are broadly similar in timing to the present day, through summer and early autumn but with a spring element, and that trap and dip net fishing was likely to have been important, rather than larger nets (Woodman 1985: 160). The possibility of some pits at Mt Sandel being used for storage of salmon is also raised, although Woodman (1985: 129) notes that eel run later than salmon and may therefore have been expected to be stored rather than salmon.

Still in Ireland, a smaller site at Lough Boora is dominated by eel (77%) rather than salmonids (23%); the assemblage demonstrates fishing of immature eels in the summer, rather than weir capture of fish as at Mt Sandel (van Wijngaarden-Bakker 1989). Salmonids and eels were also recovered from Newferry; where a washed out weir may have been identified at the base of the Newferry 3 sequence (Woodman 1978: 166-168), whilst 'stone age' weirs are noted at Toome. Woodman notes that the Irish Mesolithic may have had '...a tendency during parts of the year to rely heavily on fishing' (Woodman 1978: 168) and the Irish data is also discussed by Kimball (2000), who concludes that fish traps played a 'major role' in Irish later mesolithic subsistence practice.

In comparison, the material from eastern Scotland is very poor. The complex remains at Nethermills (Figure 71) include many stake holes as well as substantial post-holes (0.1-0.3m in diameter) in association with an extensive occupation soil, compared by the excavator to Mt Sandel (Kenworthy 1981: 3). A circle of posts 4.5m in diameter was cut into an inter-cutting series of pits. Some pits contain post- and stake-holes (Pit B), some have been deliberately back-filled (Pit A) and there is some variety of shapes. The site is interpreted as a hut. Nethermills remains unpublished, 20 years after its excavation was completed and, from the interim, it is clear that many of the pits and post-holes were not excavated, making any detailed assessment difficult. Pits cannot be simply correlated with storage and in any case, bones were not preserved in acid soils. All Nethermills indicates is some kind of settlement near a salmon rich river, and given the importance of rivers to a number of different fauna and flora (**3.3**) it is difficult to establish a single reason for settling near a river. The same is true of flint scatter sites on the Tweed (**3.3.1**).

There is little mileage in considerations of assemblage type, especially because 'fishing, particularly when shoals of fish are being sought, is something that would be difficult to deduce from the range of implements found on the settlement site' (Woodman 1978: 185). Microliths could certainly have been used as tips for leisters, but this is difficult to establish. Mt Sandel is dominated by microliths, whilst scrapers and burins are very rare. Woodman notes a spatial correlation between rod microliths and fish-bone at Mt Sandel, although he does not believe this is functional (1985: 46). Rods and points are the most significant microlith type at Nethermills (Kenworthy 1981: 7) but it is difficult to assess the implications of this, especially given potential chronological factors with rods (**2.2.1.2**). The Tweed sites are complex, with poor samples and, in many cases it is difficult to assess the character of the formal components of the industries. Many are mixed with triangles, crescents and rods all present. Haley's (1990) claim that rods dominate at Rink is based on a sample including many fragmentary pieces and the microliths are better characterised as mixed. One notable feature is that the larger Tweed sites, such as Rink, Dryburgh or Springwood, located near salmon junctions include a rich range of material: ground-stone tools, waisted pebbles (or net sinkers), and a range of raw materials including, sometimes, small amounts of pitchstone.

There is little direct evidence; salmon bones are quite low density, and do not survive well (Barrett *et al.* 1999: 366). Due to preservation conditions no fish bones are recorded from inland sites. Only a single salmonid bone from Morton (J Coles 1971) is known, and in the absence of better samples of a range of middens it is hard to know how to interpret this data. Preservation conditions in eastern Scotland have also militated against the survival of a range of organic gear. For example, preserving contexts at Vis I in northern Russia (*c.* 8350-7000 BP) contain a range of hooped implements, fine cords, net fragments, bark net-floats as well as an enigmatic 'disc of an implement for frightening fish' (Burov 1998). Finds from the Danish coasts include a range of leisters, hooks and sinkers as well as complex traps (Andersen 1995; Pedersen 1995). Kimball (1998, following Woodman 1978) argues that the comparative long-term uniformity of stone tools in Ireland masks important variation in the wooden artefacts these tools were used to manufacture.

There are difficulties here, and the question of preservation is significant, as is the lack of excavation of sites in the east, but at this stage, nothing beyond site location suggests a major role for migratory fish in the mesolithic economy, and there are many reasons why a river junction or riverside might have been an attractive location. The only other class of pertinent evidence from Scotland is that of the waisted pebbles or 'net sinkers' often found in the Tweed Valley near water, and therefore possibly associated with fishing.

5.3: '...may have served a variety of purposes'

> 'Waisted stones, generally supposed to have been used as net or line sinkers but which according to one authority, may have served a variety of purposes' (Corrie 1916: 312)

A characteristic find in many early twentieth century collections of artefacts from the central Tweed valley are 'net sinkers' or waisted pebbles. These are thin water-rolled pebbles of varied sizes and shapes with lateral notches on opposing sides, seemingly to allow the attachment of some kind of cord. The first published comment on waisted pebbles was from JM Corrie (1914), who discussed six sites from the Tweed. Eighty-seven years later, and despite the unpublished antiquarian attention in the early twentieth century referred to by Corrie (above), the artefacts are still enigmatic. Lacaille states only that they cannot be dated (1954: 166) whilst Mulholland refers to 'large numbers of pebbles with opposed lateral notches from Dryburgh and Rink (which) are presumed to be sinkers' (1970: 93). Here I present the first corpus and extended discussion of waisted pebbles from the Tweed Valley.

5.3.1: Collection and disposal

Before any analysis is advanced it is necessary to consider the background to the collection and curation of waisted pebbles in museums and private collections. Waisted pebbles are rather unimposing artefacts: comparatively simple to manufacture, they have few inherent aesthetic attractions, and many are extensively plough-damaged. Waisted pebbles may also have been found very frequently in some areas: Corrie (1916) and Lacaille (above) mentions large numbers, and 'sackfuls' are recorded from some areas in the nineteenth century (see below). Unfortunately these facts may have conspired to devalue waisted pebbles and the modern day corpus of 113 known artefacts is clearly a small sample of a once abundant type. In a number of instances we can find clear evidence of the movement and loss of waisted pebbles in the complex networks that linked collectors and agents in the twentieth century. Three examples illustrate this clearly.

Six waisted pebbles currently held in Kelvingrove Museum formed part of the Ludovic McLellan Mann collection. Mann acquired (presumably purchasing) these artefacts from JM Corrie at some time after 1914: four artefacts have Corrie's and Mann's names written on them, in quite distinct handwriting: on one (?)Corrie's writing records 'Dryburgh 28.5.1914' whilst (?)Mann adds 'JM Corrie' and 'Mann' in his hand. One undated tag reads

> 'from W(?) Corrie, St Boswells, Tweedside
> Stone implements., Pounders & Smoothers and many Net Sinkers (Waisted)
> LM'

A further undated note, seemingly for a private display case, is more explicit (Figure 72). Italics in this quotation are later additions to the original text

> 'Oval and discoid water rolled pebbles from Surfaces of Fields, Dryburgh *and district,* 1914-1916. *67 specimens in all.* Notched at the middles of either edge. Supposed to have been used as weights for nets laid on the ground for bird catching. The notches secured the string to the net; of unknown period.
> LMM'

Unfortunately, of Mann's collection of at least 67 artefacts only 6 now remain.

JM Corrie was also linked to another great collector, Henderson-Bishop (letters held in the Hunterian archive) Henderson-Bishop contacted Corrie in 1914, inquiring about the site at Dryburgh Mains, near Melrose (JMC-AHB 28/11/14). Corrie and his brother-in-law collected from Dryburgh and sent only the 'better' pieces to Henderson-Bishop (JMC-AHB 9/8/15)[39] retaining many pieces themselves and fragmenting the collections in the process. Corrie is clear about the reasons for his activities, noting that 'the money I get for these things is most useful to me for books' and mentions collecting holidays in Glenluce and Torrs. (JMC-AHB 11/6/15). By 1924 he is complaining about the prices he receives. One undated note is an evaluation by Henderson-Bishop of Corrie's finds:

11 sinkers	5/-
4 broken axes	
3 whole axes	
2 spoke shavers	£2
4 whorls	
engraved slate	
7 sinkers	2/-
small axe	6/-
axe flake	
Total	2/13/0

These 11 waisted pebbles, worth less than a small axe, are presumably lost as no waisted pebbles from Henderson-Bishop's collections are known at present.

Finally a slightly happier tale is provided by Walter Elliot's collections and personal links to many of the early twentieth century collectors from the Tweed; for in this case, although some artefacts have been lost, information can still be recovered. Elliot has collected from the

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[39] The extant artefacts Corrie sold(?) to Mann are all dated 1914 but it is difficult to believe that Corrie stopped selling to Mann and sold only to Henderson-Bishop after this date (especially given the 1914-1916 reference in Mann's note, above). In which case we might take Corrie's declaration of passing 'better' pieces onto Bishop with scepticism!

Selkirk region for many years and his collections include waisted pebbles from Rink as well as Newstead. Unfortunately 21 waisted pebbles collected by Elliot from Rink have been lost since their donation to Bradford University as part of a wider stone tool assemblage for use in an undergraduate dissertation (Haley 1990). Elliot is also a source of information about many collections, for example those of the Mason brothers in the early twentieth century. Mason collections included waisted pebbles from 3 otherwise unknown sites: Smedheugh Farm, Dryden Farm and Philiphaugh Farm (W Elliot, pers. comm.). As Elliot dryly observes (pers. comm.): 'all these were in the Mason collections but were probably thrown out when their bakehouse storerooms were being cleared out. Unfortunately sinkerstones were not very highly prized'.

These examples indicate that the present corpus of 113 waisted pebbles is severely curtailed. Despite the large numbers of finds that have clearly been made only two sites now have more than ten artefacts available for analysis and only three more than five. Different collectors have also created subtle biases to the material record. For example, Brown's collection from Dryburgh (n=8) averages 119.8±28.1g in weight whereas Lamb/Stewart's collection (n=13) averages 168.9±82.5g.[40] This is difficult to interpret but seems likely to indicate collector bias. Other patterns are harder to understand. For example CJ Browns collections from Bemersyde (n=15) average 164.4±42.5g; does this really indicate that artefacts from Bemersyde are larger than at Dryburgh? Or is it simply a product of a subtle bias?

That most waisted pebbles came from early twentieth century collections is also responsible for a general lack of detail about the location of the finds. Thirty-three artefacts held in museums (29.2% of the total) have no provenance and many more are only located by a farm name. On a few occasions, as for example with some of Corrie's finds from Dryburgh, individual fields are identified, but this detail is rare. CJ Brown's artefacts appear to have had some kind of catalogue, perhaps with individual fields, but the key to his code is missing. As well as poor location information waisted pebbles mainly came from surface collections and have no contextual information. One was found during Helen Mulholland's small excavations at Rink (Mulholland 1970)[41] but this excavation did not identify any stratification.

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[40] Figures are calculated with a trimmed mean to avoid an anomalous waisted pebble of 673g in the Lamb/Stewart collections unduly influencing the mean.

[41] Two 'waisted pebbles' were found in this excavation but BMA2581 is a very irregular, doubtful example and is not included in this analysis.

The present corpus of waisted pebbles is therefore deeply problematic. Our sample is uncontrolled and many artefacts have been lost. The locations of many find spots is poorly known and we have no contextual information for the artefacts beyond the larger assemblages of which some form part; and of course it is not clear whether these associations are merely those of palimpsest. Notwithstanding these problems, in order to interpret these finds it is necessary to consider both their date and likely function. I do this by examining first the artefacts themselves and secondly the contexts of their discovery in the Tweed Valley.

5.3.2: Waisted pebbles

Waisted pebbles are flat water-rolled pebbles with two or more edge notches (Figures 73-81). The artefacts range greatly in size (Figure 82), from 3g to 673g, averaging 164.5±94.8g (trimmed mean 161.4g) with an interquartile range of 109-205g (Figure 83). Average lengths are 93.6±21.7mm; breadth 61.3±14.4mm; and depth 18.1±5.4mm (ratio 5.3:3.4:1) (Figure 84-89). These average figures do obscure some significant variation, especially two small waisted pebbles weighing 3g. Most waisted pebbles have two notches but 5 (4.8%) have three and 1 (0.9%) has four[42] (Figures 90-92). Pebbles with more than two notches are larger, on average than those with two, but there is overlap between the types. Third and fourth notches are often located at the top or bottom of the pebble.

5.3.2.1: Production

The production of a waisted pebble appears to have been a relatively straightforward task. They are based upon a pebble blank; most are flat, and many are sub-oval in shape, but there is much variation in size, shape and weight. Most pebbles are greyish in colour, although some pinky-greys and browns are significant. In terms of colour the pebbles appear to be representative of riverine pebbles and there is little sense of deliberate selection on the basis of colour. They are mainly fine-grained greywacke or sandstone; differentiation is difficult between these geological types, and in any case, both are abundant in secondary deposits in the region.

The notches are manufactured by hammer blows to the sides of the pebble. These sedimentary rocks do not display conchoidal fractures, or rings of percussion, but flake terminations, and especially steep step terminations, are common. Many notches are formed by bifacial working with flake scars visible on the upper and lower surfaces of the waisted pebble. Frequently one

[42] Percentages based upon a sample of 107, six excluded because of damage difficult to differentiate from a possible notch.

of these scars is notably larger or more invasive than the other on a single notch; possibly suggesting that after the initial blow some smaller removals were made to finalise the notch. All lateral notches are lightly abraded rather than fresh and we should consider the possibility that the notches were deliberately blunted by flaking or light abrasion. A fresh edge may have been awkward to tie a cord around, or threatened to wear through the cord. The final shape of the notch varies widely on a continuum from very shallow elongated examples to deep concavities. It is possible that this variation is due to different uses in the past, but the irregular fracture of these pebbles may have made creating identical pieces rather difficult. Two waisted pebbles are worthy of note as their shape approaches a 'tang' (BG441.2, BG443.12). However neither demonstrate edge damage commensurate with use at the opposing end, and both are likely to be nothing more than variations on a theme.

On most pieces the notches are not exactly parallel, or in the exact centre of the pebble, but slightly offset. Notches may be placed at the apex of gently convex sides, or to the side of this. Although it is a qualitative assessment, it is notable that many notches fall into an ideal position for a hammer blow. Holding the blank as comfortably as possible in the left hand, as if to strike with the right, notches consistently sit in a natural hammering position. The artefact can be rotated in the hand, presenting the other face for a strike and in many instances the most comfortable way of rotating the artefact before a second blow presents the location of the other notch. In some cases this is achieved by rotating the pebble through its long axis, inverting the piece: in other instances, by rotating the pebble in the same plane.

The location of invasive flake scars offers some appraisal of this. Where especially invasive scars from each notch are recorded on a piece in 57.1% these are on the same face, suggesting that the artefact was rotated in the same plane, whereas in 42.9% the most invasive scar from each notch is on opposite faces. For example, if the right hand notch is more invasive to the rear of the artefact, the left hand will be to the top. This may indicate that production often involved a heavy blow to one side, the rotation of the artefact either around its long axis, or in the same plane, followed by a heavy blow to the other side, before any 'finishing' was undertaken. At one level this is a sensible approach to the manufacture of pieces that must have been likely to split or break during production, at another it is testimony to a skilled routine of bodily movement.

5.3.2.2: Use

It seems very likely that waisted pebbles were used as parts of composite tools, presumably involving some cord or line. Unfortunately interpreting their use is very difficult. The apparent association between waisted pebbles and water (see below) has suggested that they may have been used as nets, or weights for fishing but there are many possible uses. Supposed 'netsinkers' from Cumbria are now argued to be hammers used in prehistoric mining (King 1986; Birley 1961). Notched pebbles in North American contexts were used as bolas weights (Miles 1963: 38). Even if the waisted pebbles are weights for nets it is not clear whether nets were used for fishing or some other kind of activity such as bird catching. Net sinkers would not necessarily have been shaped, in Ecuador for example unmodified pebbles were used as sinkers, whilst in Peru both shaped and unshaped sinkers are known from prehistoric contexts (Engel 1983: 133ff). Regardless of the difficulty in identifying possible uses it is also important that we do not falsely unify waisted pebbles: there is great variation in size and it is not certain that all of the artefacts were used for the same purpose.

Unfortunateley, patterns of damage to artefacts do not reveal much useful information. Haley (1990: 89) argues that Corrie (1924) discusses a 'sinker' utilised as an anvil at Fairnington. However the artefacts Corrie discusses do not appear to be waisted pebbles, but pieces chipped all around their edges, and the particular example is described as having 'a portion of one side chipped' which is difficult to understand as a waisted pebble (Corrie 1924: 33). Many artefacts are heavily damaged by the plough with clear criss-crossing scars, in some instances the plough has also caused small notches and nicks to be removed from the edges of the pebble. Only 15 (13.3%) of waisted pebbles have no visible plough damage, and most pebbles with extensive plough damage also have extensive edge damage. Sometimes this damage is fresh and easily distinguishable from the main notches, in other instances it is harder to assess. It is therefore not always possible to ascertain the date of any damage on a piece. The history of collection may also be significant and the absence of broken or very fragmentary waisted pebbles may have arisen from curation by early collectors.

Although it is difficult to assess on a simple presence/absence basis a number of pieces have possible cord abrasion in the very centre of one or both notches. This is often narrow (3-4mm) and in one instance may be seen extending across the flake scar on the flat surface of the pebble although it is difficult to differentiate this from a possible natural flaw in the rock. Three pieces have hints of polishing at their ends; on BMA2040 and BMB467 this is very faint whereas on BMB431 it is more marked, and present at both ends of an object that, due to the location of notches, fits the hand very comfortably. However, this latter feature is not found on all artefacts and it is not clear that all waisted pebbles had the same purpose in the past[43]. This is especially important given the variability in size and form of the pieces. It is, to

[43] Two artefacts catalogued in the NMS (BMB428 & BMB426) are not classified as waisted pebbles in these analyses as they are very distinct in character (see catalogue).

my mind, difficult to accept that artefacts weighing 3g have the same uses as one weighing 673g beyond the simple fact that they may have had a cord attached to them.

Finally, in considering function it is important to note that simple notched pebbles of this type bear formal similarities to crude 'Mother Goddess' figurines from Near Eastern contexts (A Jackson, pers. comm.). Of course, this does not, in any sense, imply that the Scottish examples are Mother figurines: in the Middle East better examples exist to demonstrate a continuum! But it does remind us that the potential uses of these artefacts may be very complex and may not fall easily into our category of economics. One possible use for the smallest waisted pebbles, for example, is as amulets or personal decoration.

5.3.2.3: Date

The waisted pebbles offer few indications as to their date. Formal parallels for 'sinkers' of varying types can be found widely, and are often of limited validity as waisted pebbles are very simple artefacts, and the possibility of 're-invention' is strong. Very comparable artefacts are known from as far afield as South America, North America, the Baltic and Cyprus at varied periods of time (Miles 1963; Engel 1983; A Jackson, pers. comm.). In a Scottish context although references to 'sinkers' are common[44], formal parallels are rare. Haley (1990: 89) argues that a parallel may be found from neolithic contexts at Traprain Law but the artefact illustrated (Cree 1923: 192) is grooved, rather than notched, and is not comparable. A fragmentary waisted pebble is known from a grooved ware context at Links of Noltland (D Clarke, pers. comm.). However, given the different raw materials available in the Orkneys, any assessment of the formal comparability of this must await full publication. In any case it is not clear that an isolated find from over 350km away has any validity as a reference for the Tweed artefacts.

5.3.3: Locations, associations and function

Given the difficulty of interpreting date or function from the artefacts themselves we must consider the information obtainable from locations of the waisted pebbles. Waisted pebbles can be traced to 17 'locations'; of which 10 are recorded by donations and holdings in museums, 2 by Corrie (1914) and 5 by Elliot (pers. comm.). Many of these locations are problematic: most waisted pebbles are from antiquarian collections and are poorly recorded and we can only discuss the distribution of these finds at a very general level.

[44] Especially in Museum Catalogues! 'Sinkers' sometimes seems to be a useful pigeon hole category for a wide range of poorly understood artefacts.

5.3.3.1: Distribution

The most notable feature of the distribution of waisted pebbles is their concentration in the central Tweed valley, from Philiphaugh in the west to Blakelaw in the east. Figure 94 demonstrates that the distribution is extensive in the area around Dryburgh and Selkirk, indeed waisted pebbles are found on many adjacent farms: Dryburgh, Bemersyde and Whitrig Bog are neighbours on rolling hills above the Tweed. WA Munro commented to RBK Stevenson that sackfuls of 'sinkers' were taken in the nineteenth century on the high ground between Dryburgh and Bemersyde (NMAS continuation catalogue BG439-442)[45]. Fairnington and Rutherford are within 2km of each other, on rolling land to the south of the Tweed. Faldonside is centred upon a lochan above the Tweed near its junction with the Ettrick; the artefact is labelled 'Heights above Tweed, Faldonside, Selkirk'. Smedheugh, and Philipshaugh Farm lie immediately east and southwest of Selkirk. Elliot's NGR for Dryden Farm places it on a small loch above the Ale. The hills in the area of these last four sites were described by Mason in 1931 'bleak moorlands to the south and east of Selkirk ... and present the same features of bare hill tips broken here and there by little marshes or lochs' (1931: 114-5). Craigsfordmains lies on slopes to the west of the Leader and the Park on slopes to the east. No sinkers are known from further upriver than Philiphaugh on the Ettrick or Rink on the Tweed.

Corrie (1916: 312) states that the waisted pebbles are 'usually, but not always discovered in the vicinity of water' a statement that has contributed to the feeling that these pieces may be associated with fishing. But it would not do to equate water with the Tweed and many finds are made near lochans or boggy ground (presumably even wetter in prehistory), for example Whitrig Bog and Bemersyde Moss. As noted, above many finds were made in the folded, broken terrain above Dryburgh and Bemersyde. Certain locations, such as river junctions, also appear to be important but it is difficult to assess the significance of collection bias in this association. Finds have also been made from the riverside: occasional artefacts are identified to particular fields on the Dryburgh haugh whilst Elliot records many finds from the lowest terrace (F.414) at Rink (Haley 1990) arguing that they are often found near the river's edge (W. Elliot, pers. comm.). Finds at Rink have also been made from higher terraces, during Mulholland's excavations. The presence of artefacts in F.414 is of importance given the results of fieldwork at Rink (**App 2.4**) which demonstrated that the mesolithic artefacts here are derived from recent colluvial deposits and that any early Holocene land surface on Field A

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[45] The exact grid reference of NT592329 is the top of a hill equidistant between Dryburgh and Bemersyde, and is a little suspect. In a general sense this refers to the high ground above the haughs.

had been scoured away. The waisted pebbles are very unlikely to be *in situ* in these deposits and may have come from the bluff above the river.

There is little meaningful distinction in type between the artefacts from different sites (Figure 82). Slight differences in weight and size are notable, for example waisted pebbles from Rink tend to be lighter than those from Dryburgh (132.3±4.2, n=10; 181.6±129.4g). But given problems with samples and the bias of collectors it would be easy to make too much of this although it is interesting that both Elliot and Mason's collections from Rink are small (mean: 142.3g, 135.6g). In any case it seems likely that the size and weight of these artefact might be related to the type of pebbles available in any one location. It is possible that the similar sizes of Dryburgh and Bemersyde, two adjacent farms, may have arisen from these factors. Dryburgh does appear to have some exceptional artefacts, it is for example the only known findspot of any waisted pebbles with more than 2 notches (Dryburgh 4, unknown location 2) and has the two tiny sinkers referred to above. However, given that 36.3% of all known sinkers derive from Dryburgh this is unsurprising. The most interesting site in terms of artefact variation is Fairnington, where, although only two waisted pebbles are known they are two of the four smallest waisted pebbles in the corpus. It is, unfortunately, impossible to interpret this.

5.3.3.2: Associations and date

As noted above, all the pebbles are from surface contexts, sometimes as parts of larger assemblages, at other times in isolation. Type-fossils allow an examination of chronological associations. Figure 93 has been constructed using LSP project data and analyses of material in the NMS. There are no categorical associations – microliths are found on many sites, as are later prehistoric arrowheads. Waisted pebbles are frequently found on sites dominated by mesolithic artefacts, such as Dryburgh, Rink and Springwood, but all of these sites have some extent of later material although this admixture can be small. In any case given the rather irregular history of research in the area it is not possible to say that absence of evidence from a location is evidence of absence.

Despite these problems I find it interesting that the overall distribution of mesolithic finds in this area of Tweed shows a close similarity to that of waisted pebbles (Figure 95). Bluffs above river junctions and the broken and varied terrain in the region were important locations in a landscape that was extensively occupied by gatherer-hunters (**3.3**). These connections are also strengthened by the presence of waisted pebbles on so many of the large mesolithic sites in the region. Therefore, although it is impossible to establish with certainty, to my mind it seems likely that these artefacts are mesolithic in date.

5.3.3.3: Function

As reviewed above, the function of waisted pebbles is difficult to assess from the artefacts themselves. Some artefacts have evidence for abrasion in the centres of the notches, and it seems intuitively likely that a cord of some kind was tied around them and that they acted as weights. The range of sizes of the pebbles presumably reflects the use of these pebbles for different purposes although we should be careful not to homogenise the possible roles of these artefacts. It is possible that the distribution of waisted pebbles might offer some clues as to function, but in order to understand we must consider the likely relationship between the location of waisted pebble finds and the location of their use. Given that waisted pebbles are likely to have had some kind of cord tied around them and were probably not used on their own in the isolated form we see in most museums we must distinguish between the locations of procurement, production and use of the stones and the composite tools of which they likely formed a part.

The raw materials for sinkers are water rolled pebbles found in both riverbeds and relict terraces in this part of the Tweed Valley. Despite this, it seems likely that many pebbles were taken from the riverside rather than terrace contexts. Changes in the riverbanks would consistently have revealed exposed pebbles surfaces whereas vegetation cover on the higher ground is likely to have obscured the subsoil containing smoothed pebbles. Not withstanding occasional tree-throws, it is difficult to envisage substantial quantities of pebbles being available away from the river. It also seems intuitively likely that production of notches in these pebbles would have happened close to the point of procurement in case of the breakages during production that must have been common on such coarse materials. One artefact (BG443.05) appears to have been split before production as the lower surface is very much fresher than the upper: it is, however impossible to assess whether this break happened immediately before production of notches (possibly as the result of a mis-hit?) or some time before. On BG440.1 flake removals have almost entirely removed the upper surface of a pebble, and in many other instances, deep stepped terminations show the difficulty of the material. These difficulties may create a bias to the overall distribution of waisted pebbles, making it inherently more likely that these artefacts would be found in riverine contexts.

After the production of the waisted pebble it would be necessary to attach a cord to it. The production of the cord is likely to have been significantly more time consuming than the production of the pebble weight (Kelly 1996), and this may have happened in a domestic contexts, where plant fibres, sinew or leather could be stretched and woven together. It is quite possible that waisted pebbles were then used almost solely in a domestic context, as weights for stretching skins, for example. Even if the aim of production was for a tool that might be carried away from the home the preparation of a final 'net' or 'weighted line' may therefore have taken place in a domestic context before the finished article was used.

Although some of these tools were undoubtedly lost in their entirety during use, it is more likely that damage or wear and tear led to the loss of a weight or two here or there, or breakage to a cord. Given that lines may have been valued more than the weights the maintenance and repair of parts of the tool may have taken place in a domestic context. Final loss or abandonment may therefore easily have come in this context. It is also possible that a mobile population might cache weights in particular contexts, especially if the tools were rather specialised. All of these factors imply that the locations in which we find waisted pebbles are not necessarily the locations in which they were used.

There is also little to be said about the associations between waisted pebbles and other artefacts in scatters. Problems with sampling are very significant here but there are no simple patterns. Waisted pebbles do frequently appear on the larger, more diverse mesolithic assemblages in the region and it may be that they are associated with some kind of specialised activity, but this is impossible to interpret. There is therefore little that can be said about the function of waisted pebbles from their distribution in the landscape.

5.3.4: Discussion

The waisted pebbles of the Tweed Valley therefore remain enigmatic and it is still not possible to definitely attribute them to a period of time, or a function. In fact it seems likely that the attempt to identify one function for a diverse group of materials is misguided, and the production of waisted pebbles may indicate an accepted way of attaching weights to lines, not of making one tool. The recovery of more waisted pebbles, with more control over samples will allow further investigation of many problems, but until an example is recovered from a dateable context they will remain ambiguous. In any case, there is no strong evidence for their use in fishing (or that they were *not* used for fishing!) even assuming that they are mesolithic in date. Bird nets? Bolas weights? Amulets? Line weights? For stretching hides? Eighty-seven years later Corrie's 'authority' still seems reliable

> 'Waisted stones, generally supposed to have been used as net or line sinkers but which according to one authority, may have served a variety of purposes' (Corrie 1916: 312)

5.4: Interpretations

The data for the importance of riverine fishing in eastern Scotland is weak. We have no direct evidence for the character or extent of fishing and the one artefact class that has been associated with these activities is deeply ambiguous. In effect, even after reviewing all the evidence that might pertain to fishing we are left with little more than the location of sites and hints of diverse assemblages in riverine, contexts, especially in the Tweed Valley. Even given difficulties with preservation this seems surprising. Intuitively the wealth of the fish resource is such that we anticipate that it would have been important in the past but we cannot find any evidence for this.

This tension is not unusual. Hälen (1995), for example, argues that the lack of evidence for salmon in coastal mesolithic contexts in northern Sweden 'simply cannot reflect the prehistoric reality' (1995: 235) given the historical import of this resource, noting the possible significance of taphonomic factors. Indeed, looking more widely in European mesolithic contexts, there is little or no evidence for the extensive exploitation of salmon. Jochim's generalising models suggest that mass trapping of salmon was not significant in the Upper Rhine (1979). Salmon remains form a very small part of Danish coastal assemblages, and may have been taken alongside other fish in bulk traps (Enghoff 1995) but eel may have been more important in this area. Finally they are also unknown from western Sweden until the TRB (Jonsson 1995). This disjuncture between our expectations of mesolithic behaviour and the apparent evidence for that behaviour is interesting. Migratory fish seem to be such a rich resource, and ethnographically have been significant, but we can find little evidence of this. Taphonomic factors are surely significant, but there is little feeling of a specialised gatherer-hunter salmon fishery in eastern Scotland, or indeed elsewhere. The Irish evidence is distinctive, but so is much of the mesolithic record from that island, and it is not clear that it is a meaningful parallel to the east of Scotland.

This presents an interesting challenge, and one way of interpreting this is to have a much closer look at salmon behaviour. So far in this discussion a number of broad level statements about the abundance and timing of fish runs have been made alongside reference to ethnographic data about the character of societies on the Northwest Coast of America that are reliant upon salmon. At this stage it is necessary to pick apart these categories in order to build new frameworks for eastern Scotland.

5.4.1: Themes and variations

The gatherer-hunter-fishers of Northwest America seem a distinctive, if varied, group of peoples and many commentators have made generalising links between their character and the exploitation of salmon. And yet, this relationship does not appear to be apparent in eastern Scotland, or some other areas of northwest Europe. Why might this be? There are a number of reasons, ranging from biological differences, through structures of analogical thinking, to human choices.

5.4.1.1: Problems with fish

In the first instance, the Northwest Coast societies are reliant on different species than Atlantic salmon: namely, chum (*Oncorhyncus keta*), king/chinook (*O. tshawytshca),* coho (*O. kisutch*) and sockeye salmon (*O. mykiss*). The natural resource has significant behavioural differences and is therefore not directly comparable and human societies reliant on this resource should not be used as a direct analogue. In this context it is also important to note that variability is a much greater part of salmon fishing societies in the Northwest Coast Americas than has often been supposed (Plew 1996; see below).

It is also necessary to consider the use of modern Atlantic fish stocks as analogues for prehistoric activity. Any attempt to utilise modern analogues for the behaviour of salmon in the early Holocene must attempt to justify the relevance of the uniformitarian assumptions on which this is based. A number of areas require examination, including climatic change, sea level change, river change and genetic change in salmon populations.

The *Salmonidae* family originated from Pliocene cold-water sea-fish but much development was related to glaciation. As glaciers melted the salinity of seas was reduced and salmonids began to move between salt- and fresh-water (Netboy 1968: 21). Unfortunately no details are available of the dates by which salmon colonised Scotland but cold-sea refugia existed from the Bølling-Allerød/Windermere interstadial (B Coles 1998). Salmon vary genetically according to their home rivers and discrete populations exist even within river systems (McLay & Gordon-Rogers 1997: 7). Many generations separate salmon of today from those of the interstadial or early Holocene and some degree of genetic variation may be significant in assessing the relevance of modern analogies for past behaviour patterns, but it is difficult to quantify this factor.

Salmon activity is closely related to water temperature and in colder waters salmon start their spring run earlier and spawn earlier (Malloch 1912). Temperature changes and changes in marine circulation within the northern hemisphere, particularly the movement of the Gulf Stream, may therefore have been significant even if these factors are presently not reconstructed (Jonsson 1995). Atlantic salmon are very sensitive to environmental change (ASF n.d.) and it has been argued that sea level instability will reduce salmon numbers due to difficulties with changing sedimentation processes (Yesner 1980). Some authors have suggested that the comparative global stability of sea level after the collapse of Scandinavian and American ice sheets *c.* 6000 BP is directly related to the rise in specialised exploitation of salmon (Cannon 1996).

In a general sense the 'essential' requirements of a good salmon river are silt-free gravel beds, good quantities of fresh water, falls and ponds (Mills & Graesser 1981: 24ff). Many of these factors are beyond the littoral zone affected by sea-level change but some processes of geomorphic change are clearly significant. Historical accounts record problems with river estuaries and sediment movements. Sand bar formations are recorded at Aberdeen (Dee and Don), Montrose Bay, Foveran, Slains and the River Ugie (Leask 1996). In three of these examples the creation of sandbars is associated with changes in resource availability. A mid eighteenth century account from the Don records that 'many years ago the river near the sea took a long turn to the south, which rendered it so shallow that salmon could with difficulty enter it' (Leask 1996; 45ff). The formation of bars in estuaries could have important implications for the availability of resources in the immediate area, and further inland. Despite these factors Canon (1996) notes that variation in stream types and microenvironments may have locally offset macro-scale processes, although it is not clear at which scale these factors operate. Certainly the habitat diversity of salmon, trout and eel in eastern Scotland may have helped militate against dramatic resource change.

These varied arguments imply that it would be naïve to easily read from modern abundance of fish stocks to dominance in the past. Sea level change, whilst not absolutely prohibiting the availability of salmon, may have contributed in conjunction with other factors to an instability in this resource at a number of levels; from daily through annual to those of the generation. Cannon's (1996) study of Northwest American fisheries highlights both short- and medium-term variation in salmon and she notes the most analyses of fishing have shown '...a lack of consideration for the inherent temporal variability of salmon' (Cannon 1996: 25).

Short-term differences range from daily changes in fish quantities through to yearly patterns. For example, the pre-Soviet fishing economy of Kamchatcka, also reliant upon salmon, was characterised by significant hardships caused by annual variation (Shnirelman 1994). In this context the modern day periodicity of salmon behaviour of 8-11 years (Jochim 1979), although not suitable as an analogue, reminds us of other rhythms of flux. Cannon (1996) argues that many medium-term changes in fish population would have been perceptible to humans, and significant at the decision making level and that medium-term abundance led to experiments with intensification in the Northwest Americas. In contrast, storage is seen as a response to short-term phenomena.

In all these varied factors imply that Jochim's description of salmon as 'a singularly predictable and productive resource' (1979: 220) is entirely misplaced in an early Holocene context. In eastern Scotland it is possible that a range of factors contributed to some medium-term instability as well as short-term fluctuations in the salmon resource and that, as a consequence, an intensive riverine fishery for migratory fish did *not* develop. This is not to argue for environmentally deterministic factors, but to note that some kind of social decision not to intensively exploit a variable salmon resource. Similar arguments have been made in an Irish context (Kimball 2000). Medium term instability, recognised by agents in the past, may therefore have been one reason to utilise a more generalised economy, in which salmon played a part rather than an intensive salmon economy. This sort of approach is coherent with our evidence: the lack of specialised tools, the lack of evidence for large-scale storage and is possibly suggested in the location of sites. Rocky shallows and river junctions are locations ideally suited to smaller-scale exploitation of fish stocks through spearing and small nets rather than weirs or deep nets (see Jochim above).

5.4.1.2: Contexts of behaviour

In terms of social relations and our understandings of identity in the past we begin by considering the seasonality and temporality of fishing. Fishing may offer a close temporal focus for activity. It is often reconstructed as part of a seasonal round in functional analyses, and many commentators have utilised modern, or near modern analogues for this. Kenney notes that Dee salmon runs were affected by post-glacial temperature variations, arguing that runs begin earlier in warm and calm conditions, and may therefore have begun earlier during the Climatic Optimum than they do today (May). She therefore argues that fish could have been an important resource in early spring, when other sources of food were comparatively rare (Kenney 1993: 205). However we have noted that salmon begin runs earlier in *colder* conditions, and Kenney's model may be flawed.

Kenworthy (1981) also discusses spring resources and Woodman also assumes timing is similar to the present day (1985). However, these kinds of seasonal details of salmon behaviour cannot be utilised as close analogues for past behaviour. For example, in the last century there has been a cycle in the timing of runs in the Tweed: before 1910 the autumn run was dominant then the spring runs became more important, after the 1960s the autumn run was again ascendant. Dee runs also appear to have changed: Mills and Graesser (1981: 81) regret the loss of 'the famous autumn run of old...'. George (1982, cited by Walker 1997) argues for long term gradual cyclical changes in timing of Atlantic salmon run. In the context of changes in fishery management, pollution and outbreaks of fish-disease such as ulcerative dermal necrosis (UDM) (Mills & Graesser 1981) it is not possible to assess the causes of these changes, but they imply that we should be very careful about assessing the seasonality of salmon availability at any period in the past on the basis of modern analogues. Any detailed analogy would clearly be inappropriate but a generalisation that autumn and spring might be important times might be highlighted although it is difficult to assess clearly. Some other general themes are also of interest.

First, the timing of salmon runs varies greatly between rivers. In colder northern waters salmon start spawning earlier in the year and also start their spring runs earlier (Malloch 1912). North of the Tay no rivers have autumn runs today, and the Tweed is notable for its very late fishing season, with runs extending into December. In these waters fish 'seem to run at almost every month of the year' (Netboy 1968: 224) but seasonal variation does still take place. It is possible that similar differences existed during prehistory, and that given basic climatic and marine differences between the areas the timing and availability of the salmon resource was different in the northeast than it was in the southeast. The northeast, and particularly places such as Aberdeen Bay, were also especially favourable locations for sea trout. This, in turn, might be understood in terms of how people came to know each their place in world, through the complex overlapping contexts of varied labours. Differences in the seasonal routines of behaviour may have been important differences in the ways in which people came to know themselves in different areas of Scotland. It is, at this stage, difficult to assess the details of these phenomena, but they are of some interest.

A second generalisation is that salmon will rest during their run at junctions or pools and the timing of their runs will be affected by variations in water levels as well as atmospheric conditions (e.g. Bonsall 1981: 468). Therefore the penetration of fish upstream is likely to take place much later in the year than their arrival in lower waters. This is clearly seen today on the Tweed, where salmon enter in every month of the year and most of the river is used as a spawning ground. During spring only a few fish penetrate beyond the junction of the Ettrick and the Tweed. Beyond this, and especially in the Peebles area, fishing only really begins in September and reaches a peak in October/November (Mills and Graesser 1981). On the Dee the stretch immediately downstream from Banchory is a very good spring fishing as fish pause in the face of snowmelt from upstream. Although the locations of many resting points will have changed river junctions may have been comparatively stable, and will have been good locations in which to maximise the chances of finding fish. The fairly large, diffuse scatters at many river junction sites are very interesting in this regard. One further implication of this pattern of movement is that the seasonality of salmon exploitation may have been more marked the further upstream one journeyed. In this sense, it is notable that sites upstream of Rink on the Tweed do seem to be smaller than those downstream, whilst on both the Dee and the Tweed the main concentrations of occupation are in the region where, today, salmon are present for larger parts of the year. There are problems with sample sizes here, but this may imply differential patterns of procurement and settlement. Salmon may have been taken in different contexts, in different groups, on different parts of the rivers.

It is possible that the comparative wealth of salmon, trout or eel at certain times of the year in the middle stretches of rivers enabled larger gatherings of the community. Large gatherings require feeding, and riverine resources may have provided an important focus for these activities at certain times of the year. Storage may have been less important than the consumption of large quantities of fish in big groups of people. At Rink, Dryburgh, Kalemouth or Springwood for example the variations in assemblage types and raw material may have derived from gatherings of people from different areas in the context, perhaps, of some kind of ceremonial. The small quantities of pitchstone, and possibly traded flint, on these sites might also be understandable in this kind of context.

Variation, at a number of levels, must have been significant. The details refuse resolution, and, in any case, we should not anticipate that either human or fish behaviour remained stable over time. Salmon may have been taken for different reasons at different times; exploited late in the year when spawning, for roe rather than flesh for example. Nor should we forget that the harvesting of fish and other riverine resources involved groups in particular relations of authority. Learning how to manufacture, wield and throw large leisters, or the best ways of gutting, smoking and eating the fish were likely to have been significant. At times these actions may have taken place in large groups and men or women competed, commenting on the prowess of others, establishing networks of dominance and equality through their jokes. Spearing may have taken place at night, when torches provided the best ways of identifying fish in the shallows. At other times a lone spear- or net-person may have gathered enough fish to feed a few mouths only on a journey up river to visit kin over the watershed. The ability to watch for fish, to recognise bountiful pools and locations, where a small net might be fruitfully dropped, and where best to cut the skin, were important skills. These may have been formally taught in part, but were more likely to have been gained through attentive experience in a variety of contexts. They were historically specific skills informed by particular contexts; and it is likely that these places and routines were caught up in myths and legends, paths and rhythms that helped people find their place in the world.

5.5: Conclusions

It would be easy to make too much of this kind of data, which has ambiguity written through it and has consistently eluded any sharp focus. However, some broad models and distinctions can be made on the basis of this evidence, including reference to differences between regions and some patterns of context and behaviour.

The evidence for riverine fishing in the mesolithic of eastern Scotland is weak. Although preservation may be significant there is little evidence for intensive fishing beyond the location of some sites at significant modern fisheries. Initially surprising, this lack of evidence for an intensive fishery is paralleled in a number of areas of Europe and there are a number of reasons to consider that medium term instability in the resource made a decision to intensify fishing unlikely. Notwithstanding this, salmon trout and eel are likely to have been important social resources: possibly providing occasional surpluses to feed large groups of people, or just a reliable source of a meal during spawning times. It is difficult to assess the seasonality of fishing, but broad level distinctions might be made between the north and south of Scotland which had slightly different resources, which may have run at slightly different times. Further distinctions could be drawn between the lower and upper parts of rivers. More work is needed to explore these patterns in detail, but it is unlikely we can ever capture them in any more than the crudest of terms. All I offer here is an analysis that opens up the material possibilities of the past, moving beyond an objectified gatherer-hunter-fishing society, and to consider the ways in which their lives came into being through particular contexts and activities.

Chapter 6: Coastal settlements

> 'We are floundering on the subject of social relations and in that sense our understanding of people and the sea is just beginning ... the paucity of papers on social relations and ideology may be partly due to the methodological problems of investigating these issues, but partly they reflect, I suspect, the male preoccupations with things rather than relations, the unwillingness to address these intangible issues' (Zvelebil 1995: 421)

This chapter discusses the influence of the coast on mesolithic settlement and social reproduction in eastern Scotland. The coast plays an axiomatic role in interpretations of the European mesolithic, and these approaches are criticised on theoretical and empirical grounds. Furthermore, such approaches objectify mesolithic societies rather than taking seriously the potentials of the evidence to inform us of the conditions within which people came to terms with their world.

First, I review the literature on the significance of the coast to gatherer-hunter communities. Secondly, I discuss the beaches of eastern Scotland. Thirdly, I review the existing archaeological material from the east. Finally, I present analyses of the Sands of Forvie.

6.1: We do like to be beside the seaside...

> 'Just as an abundant supply of coal does not explain an industrial revolution, the abundance of aquatic resources does not account for a transformation in social relations' (Pálsson 1991: 34)

Many interpretations of the temperate European mesolithic assume the significance of coastal resources. From 1981, when Brothwell and Dimbleby (1981: 5) argued that 'there is no doubt we have tended to underestimate the potential value of the coastal eco-system in supporting human communities', much has changed. Recent international symposia suggest that studying the mesolithic contributes to understanding 'a distinct aspect of human history: coast-adapted foraging societies' (Fischer & Myrhøj 1995: 12). Commentators seem unanimous: Simmons for example argues that 'coasts exert a very strong pull force in terms of available resources, to the extent where no human society would ignore them unless prevented by other human groups from gaining access to them' (1996: 194, 206ff). The most important analyses focus upon the Ertebølle of Denmark; notwithstanding minor disagreements, Rowley-Conwy's (1983) constructions of the Ertebølle as a sedentary, 'complex' gatherer-hunter community heavily reliant on marine resources have been very influential. Recent accounts have clarified the ways in which these communities exploited the coast: large stationary fishing structures caught wide ranges of fish throughout the summer (Enghoff 1995; Pedersen 1995). Approaches to the mesolithic settlement of western Scotland are broadly in keeping with such interpretations, and the importance of the sea to these communities is not in doubt.

The exploitation of the coast has been associated with social complexity (**3.2**) as many near contemporary maritime communities are often sedentary, hierarchical, and with notions of property (Renouf 1988). Therefore for many commentators the coast was *the* central phenomenon of mesolithic life (see Fischer ed. 1995). Not only did it influence the character of the seasonal round, but also the character of social relationships. These are interesting arguments, if rather generalist. It is not necessary to question the importance of the coast to *some* gatherer-hunter communities, but separate issues require disentangling in order to understand the significance of the coast in mesolithic eastern Scotland, and especially the ways in which this was manifested. First, I discuss the ambiguity of maritime exploitation; second, social choices; and finally some attempts to avoid objectifying accounts.

6.1.1: Ambiguity

Coastal resources vary in character and their exploitation takes many forms, from entirely maritime (fishing) through to entirely land-based (hunting seals on rocks). This range of activity is difficult to characterise, and coastal economies have often assumed a rather ambiguous role in traditional classifications. For example, whilst it is easy to consider shellfish as being 'gathered' and sea mammals as 'hunted' it is difficult to categorise the exploitation of fish (Pálsson 1988, 1991). Nevertheless Pálsson (1988: 190ff) argues that if understood to relate to 'hunting and gathering of aquatic resources' in a broad sense, 'fishing' does highlight important comparisons between communities; namely, that fishing communities are distinct from other gatherer-hunters, and that it is therefore a worthwhile category.[46] However, notwithstanding broad comparisons it should be noted that much variation is possible. Different marine economies stress specific affordances of the coast, and the conflation of place of residence with mode of production at any specific level is not appropriate.

6.1.2: Latitude or choice?

One important analysis of 'fishing' (used here in the broad sense advocated by Pálsson) holds that its importance is related to latitude. The argument is that amongst gatherer-hunters the extent of fishing is negatively correlated to that of gathering, and that fishing is more common in the north than in the tropics.[47] Pálsson criticises this on empirical grounds, concluding that

> 'one should reject the notion that the terrestrial ecology is the cause of the latitudinal distribution of fishing. The reasons have probably more to do with social and political processes, state formation and colonialism. One must not forget that the 'present' ... represents post-colonial society and there is no guarantee that in the more distant past fishing, gathering and hunting showed the same geographical distribution' (1988: 194).

Notwithstanding these complex historical processes models derived from ethnographic studies also dichotomise between tropical and northern regions, whereas the variety of societies in temperate zones may have been greater in the past.

Pálsson's arguments imply that we abandon any simple correlation between latitude and fishing. Fishing is a choice, not determined by the environment:

> 'the importance of fishing (the gathering and hunting of aquatic resources) may be responsive to both ecological and social factors ... the decision to fish may in fact depend on internal social dynamics ...rather than seeing marine resources as determinants of social complexity one

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[46] Pálsson is vague about the reasons for these similarities, seeming to connect them to fishing as a mode of production (see Pálsson 1991: 34). For example he discusses cognitive, technological and sociological factors that may differentiate fishing from gathering or hunting. The effective exploitation of the marine environment requires the development of a particular body of skilled practices, both material and mental, and this may contribute to certain characteristic social relations (Pálsson 1988: 190, 1991).

[47] Some commentators believe that the importance of the coast to northern communities is due to the comparative absence of plant resources, others that the importance of plants to tropical communities is due to the relative nutritional poverty of marine resources at these latitudes (Pálsson 1988: 194).

should regard coastal niches as just one possible avenue for intensification' (Pálsson 1988: 203-4).

The importance of choice in the exploitation of maritime resources is demonstrated by the colonisation of Norway. There is very little evidence for settlement in Norway before *c.* 9500 BP, implying that this 'rich, arctic coastal area (was) lying unused for thousands of years' (Bjerck 1995: 140). After *c.* 9500 BP an extremely rapid colonisation of the northern coasts took place, likely requiring the development of a particular body of maritime techniques (ibid.). Before this time communities may not have developed these techniques, or, more importantly, may not have wished to do so (Finlayson 1999). The exploitation of any environment is not determined by its wealth, or by the possibilities of technology, but by a human decision to focus attention on that resource.

6.1.3: Objects of analysis

A notable consequence of many accounts of the coastal mesolithic has been the objectification of those communities. For example, coastal studies are seen as ideal opportunities for identifying environmental impacts on society (*e.g.* Bailey & Parkington 1988: 4). All too often our accounts are of a generalised analytical coastline, inhabited by suppositions and imperatives. Social relations raise their heads every now and then in these discussions, but are dismissed as 'complex' and explored no further. We gain little sense of the landscape or seascape as part of a process of social reproduction, only as a fairly abstract set of potential resources.

Pollard's (1996) account of the significance of the coast to ritual and cosmological practice in prehistoric Scotland is an interesting exception (also Warren 2000a). Pollard's seascapes are not those of an objectified coastal society, but are concerned with how people made sense of coastal landscapes. At times, his account is sweetly observed:

> 'low tide occurs every day, twice a day, and it is these temporary windows which provide the cue for the intensification of activity on the shore, with people perhaps setting aside other tasks and moving from areas removed from the shore in order to reap the harvest of these temporary forests of kelp and fields of mussels' (Pollard 1996: 203).

The interpretative resonance of this is heightened by comparison: 'time for the agriculturalist or hunter is marked by the sun, while for the fisher it is marked by the effect of the moon on the movement of the sea' (ibid.). Unfortunately, Pollard's narrative does not maintain this engagement with the materiality of inhabitation. His accounts of liminality, transformation and enskillment are abstracted, relying on the importation of broad analogies in order to interpret, for example, the role and engenderment of women. This lacks conviction, and we gain little sense of the interplay between routines and the maintenance of forms of understanding or skill.

These arguments imply that there are significant problems with existing models. We cannot simply assume the importance of the maritime resource to mesolithic gatherer-hunters nor that this implies 'complexity'. Whilst in a European context the coast was evidently very important to some communities we cannot suppose *a priori* that this was true of all groups with access to the coast. It is also impossible, in the abstract, to assess the *ways* in which the coast may have been significant either to a collective, or to an individual. Too often our accounts have dismissed such concerns, but as the epigraph to this chapter states, we should strive for rather more.

6.2: Scotland's eastern coast

Sandy beaches and spectacular cliffs dominate Scotland's eastern coast. The distinction partly reflects underlying geology – in the former areas, relatively soft sandstones or sedimentary rocks, in the latter, crystalline or metamorphosed sedimentary rocks – but repeated Pleistocene glaciation has also been vital, depositing varied tills and creating large amounts of glacio-fluvial material that have been the main supply of sediment for beaches. Of the two coastal types the archaeology of the mesolithic is dominated by beaches rather than cliffs.

6.2.1: Beaches

Beaches are not distributed evenly around Scotland's coasts. On average 6.5% of Scotland's coastline is beach, but some areas are more heavily beached than this, and the most important group of these is eastern. Beaches are therefore not only an important aspect of the eastern landscape, but a characteristic that distinguishes this area from western seaboards, which are more likely to be rocky. The coasts were rather different phenomena in these areas, and this, we might expect, had implications for the character of people's lives in those areas.

Many of the lowland beaches of Scotland are long and straight with a prominent dune ridge (Ritchie & Mather 1984). Inland of this is typically found an area of links, frequently covered with a variety of dunes, sometimes in waves, often in a variety of stages of degradation and erosion. The amount and type of vegetation on the dunes is important in determining the stability of these systems. Blowouts are relatively common, and deflated areas extend down to near the water table where the increased moisture content in the sand counteracts wind erosion. Sometimes deflation areas open onto subsoils. These long, extensive beach systems are a rather monotonous environment, not conducive to supporting a wide range of plant or animal life (Ritchie & Mather 1984: 69ff). Estuaries offer a much wider range of habitats, and support a greater variety of species; they are a rare but important aspect of the eastern coast.

6.2.2: Changing environments

Beach and dune environments are very sensitive to change. Sand systems achieve equilibrium by continual small-scale adjustments, such as the cycle on Aberdeen beach where the gradient and profile of the beach change through the year (Ritchie *et al.* 1978: 9). Catastrophic events, dramatically changing the distribution of sediments, can therefore be very significant. The North Sea littoral today is particularly prone to tidal- and storm-surges that rapidly and extensively rework dune systems (Ritchie & Mather 1984: 19) and the situation may have been similar in prehistory. Other important processes include wind-blown sand. The progress of sand across large areas has been demonstrated dramatically at Culbin and reconstructed carefully at Forvie (see below).

Estuaries are especially unstable, and many historical accounts record problems with estuaries and sedimentation. Changes in estuaries could have important implications for the availability of resources in the immediate area, and further inland (see **6.4.1** for changes in salmon availability caused by sand-bar movements). Large-scale changes include major shifts in the position of estuaries, suggested for the Don and the Dee (Leask 1996) and confirmed for the Ythan (Ritchie *et al.* 1978: 7). Whilst recent coastal instability may have been exacerbated by human activity sea levels varied throughout the Holocene (**2.5.5**), leading to changes in the systemic equilibrium possible on beaches. Whilst archaeological narratives often stress long-term processes, local effects may have been dramatic:

> 'The variation in rate of rise, standstills, and oscillation combined with local topography, mean that land-loss probably occurred in fits and starts ... At any given location, there may have been no perceptible change for decades or even centuries, followed by a catastrophic incursion of the sea ' (B Coles 1998: 67)

Yesner also observes that rapid sea level rises will lead to problems with sea-runs for fish and changes in mollusc behaviour (1988: 55). As well as processes the single most dramatic *event* is the 8m high tsunami of *c.* 7000 BP caused by the Storegga submarine land-slip (Dawson *et al.* 1990; Long *et al.* 1989). The human or geomorphic significance of this event is hard to assess, but must have been extensive, perhaps causing systemic changes in beach processes. For a number of reasons therefore, an important characteristic of the mesolithic coast was change.

It is difficult to move from images of contemporary beaches to the character of prehistoric beaches. Beaches are a very complex landform (Pethick 1984) and many factors have changed. Sediment supply will have been much greater in times of comparative sea level fall than sea level rise. It is possible that during times of sea level rise beach systems were less extensive in scale. In any case the beaches of eastern Scotland formed a distinctive ecological affordance for mesolithic communities. This was changing, at a variety of time scales throughout the period, but we might note the potential importance of estuaries as opposed to long uninterrupted beaches. Estuaries were ecologically significant, if rather unstable in the medium-term, and hills or rises of well-drained land may have been important points of reference in the context of a diverse, changing environment. However, as noted above, we cannot assume the character of mesolithic exploitation of these varied resources in isolation from the evidence we have from the area and it is to these data that discussion now turns. There are difficulties with any review of this type (**2.5**) but the evidence is suggestive.

6.3: Mesolithic settlement in the coastal zone

There are a variety of mesolithic sites on or near the modern-day coast, including middens and a variety of flint-rich sites. Although the evidence is not extensive, most sites indicate that coastal settlement was small-scale rather than intensive.

6.3.1: Lithic rich sites

At Castle St, Inverness two mesolithic horizons dating to 7275±235 BP and 7800±85 BP were identified in a natural hollow in a ravine above the Ness, to one side of Castle Hill (Wordsworth 1985). Wordsworth argues that the lithics are remnants of a larger scatter, preserved from the transgressing sea by their location in a ravine. Of 4,754 artefacts, 98.7% were beach-pebble flint. The assemblage is dominated by tertiary waste; primary waste is very rare, as are cores and core-trimmings. This arguably arises from movement of pre-prepared cores to and from site. Retouched pieces range from light, miscellaneous forms into microliths and scrapers. The truncated site appears to have been some kind of riverine or estuarine occupation predating the MPGT. It is difficult to assess whether the occupation is multi- or single-phase, especially because of the large standard deviation of one radiocarbon determination, but the scatter may be a result of repeated occupation over some time. This may be borne out by reuse of previously worked tools (1985: 97). The evidence suggests that the site was not a 'base-camp' as such and it is interpreted as a 'hunting camp' (1985: 100) although the range of material suggests some diversity of tasks, and problems with these terms have been noted (**3.1.1**).

Further coastal sites are known in the northeast, from surveys carried out by Reading University through to famous sites such as Culbin. Extensive collections are also known from in and around the Sands of Forvie, and in raised beach contexts at Menie Links, a short distance away from the Ythan estuary itself (**6.4**). Fairly large collections have been made from hills immediately above the Don estuary[48] and three small mesolithic scatters in Aberdeen have been excavated (Kenworthy 1982). At the time Aberdeen was probably a varied, rich environment, with low gravel hills rising above mires and estuarine channels (Shepherd 1996) and the evidence seems coherent with many small-scale sites rather than large single sites although, of course, the picture is fuzzy and many sites may have been lost.

[48] The artefacts were found during the building of new houses and in the area of a school (*c.* 80-100ft above sea level) (M Stoker to Prof Lockhart, 19/7/57; Marishcal Museum, Aberdeen). The industries include many cores, blades, and 'odd half finished blades'. 408 artefacts from Stoker's collection are held by the Marischal Museum but more were mislaid before donation, or are held privately. The collection has clear mesolithic affinities, although the absence of classic microliths should be noted.

Kenworthy, for example, argues that the St Paul St site is a single occupation on the basis of the presence of all stages of reduction, and the possible presence of a hearth. Kenney (1993)[49] interprets this evidence as *part* of an economic system with base-camps at major river junctions exploiting salmon.

Further south, a large mesolithic pit dating to *c.* 5750 BP was discovered at Spurryhillock, above marshy contexts near the coast at Stonehaven (Alexander 1997). Lacaille (1954: 177) records the discovery (and loss) of *c.* 150 flints, fire-shattered stones, charred wood and possible bone from a 12" deep black band between two marine deposits, culminating at over 40ft above sea level at Broughty Ferry.[50] Complex flint scatters from Morton are found in association with light structural remains. Evidence from the midden deposits here assists the interpretation of these as short-term settlement of people who ranged fairly widely across the local landscape (J Coles 1971, 1983).

Recent excavations at Fife Ness uncovered a small site, dating to *c.* 8500 BP (7400-7600 cal BC) (Wickham-Jones & Dalland 1998). 1516 lithics and two cobble tools were found in association with traces of light structures, including an oval pit containing hazel-nut and burnt flints, with a series of pits or post-holes to the northeast, all sealed by an occupation soil (Figures 10, 11). The site is interpreted as a short-lived, possibly specialised camp; potential exploitation of sea birds is noted. The site seems to have sat upon low cliffs some 70-300m from the sea. The hinterland is likely to have been wooded, with sparser hazel woodland on the cliff edge. The lithic industry is based on a local, fairly homogenous flint source. However cores and débitage are rare, and most tool manufacture was not taking place on site. The most striking aspect of the assemblage is the dominance of crescentic microliths. Often rare, especially away from the coasts, these are taken as evidence for a rather specialised site function. The excavators argue that Fife Ness is unusual, but whilst it is rare to identify and excavate such small mesolithic sites, in a broader context of sites on the east coast, a small site is not unique and there are also parallels for the many aspects of the assemblage, such as the rarity of cores, if not for the microlith types.

Further south a few flint scatters are known from the coasts of the Forth. A complex site is known at Cramond, on slopes on both sides of the Almond at the coast. To the east pits and hazel-nuts were identified beneath a Roman fort (Dean 2000) whilst to the west fieldwalking

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[49] Kenney also records other sites in Aberdeen, but these are hard to assess.
[50] The occupation at Broughty Ferry was sealed by 'an exceptional tide which disturbed the refuse of occupation and covered it in sand' (ibid. 178), Dawson *et al.* (1990) note that this is may be a tsunami

has uncovered substantial numbers of later mesolithic artefacts relying on the exploitation of local meta-silts. Further east mesolithic finds are known from Gullane Sands.

6.3.2: Middens and other coastal evidence

Many of the shell middens in eastern Scotland indicate discontinuous or temporary settlement. For example, at Muirtown, Inverness the midden is interpreted in terms of 'frequent and not necessarily short-term visits by a few individuals at any one time who made use of particular hearth areas on a number of occasions. Non intensive exploitation of local shellfish stocks would seem to be the implication' (Myers & Gourlay 1991: 23). This kind of occupation is also the implication of the weathering surfaces and growth line evidence at Morton (Dieth 1983, 1986) where occupation may have been discontinuous and where shellfish collecting appears to have been subordinate to lithic procurement. The large, oyster dominated middens of the Forth (Sloan 1993) are rather different in character, but it is difficult to assess the date of these features, which may not all be mesolithic (**2.3.2**). The apparent importance of off-shore cod-fishing at Morton is of interest, as it slightly contradicts the general impression of small-scale coastal activity implied by the review of the data so far. However the presence of some line fishing does not negate the possibility that occupation on the coasts was discontinuous. Nor does the presence of presumed specialised maritime technology, such as the Blackness Bay harpoon (**2.2.2**), dictate that mesolithic settlement was primarily orientated towards coastal resources. The bone and antler tools found in conjunction with whale skeletons in the carse clays of the east have often been assumed to derive from the exploitation of casual strandings (Atkinson 1962; Piggott 1982).

6.3.3: Discussion

The significance of the coast to mesolithic communities in eastern Scotland is not clear, especially given difficulties with potential biasing factors (**2.5**). Coastal change in particular is significant and has removed the possibility of studying the coastline for much of the period. However it does seem that coastal sites were important both before (Inverness) and after the transgression (Forvie). Some locations appear to have remained significant throughout (Morton). Middens mainly date to post-transgressive contexts, but it is not clear to what extent biasing factors have influenced this.

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deposit. If the height of over 40ft is correct this implies that the tsunami was considerably larger than 8m (*c*. 24ft) in height.

In this biased sample, many sites appear to be associated with estuaries, either located on dry ridges above presumably wet areas, or in some cases found in sheltered ravines. However some scatters are found away from estuarine contexts (Menie) and there is no strict pattern to the location of sites. The general picture is of relatively small-scale activity both before and after the transgression. Most flint scatters are small, or resolvable into repeated occupations and many sites suggest the importance of the coast as a location for lithic procurement. However the relatively abundant presence of coastal flint may increase the archaeological signature of these locales. This certainly appears to be true at Forvie and Cramond, where exploitation of local sources is reflected in the character of the industries. However at Inverness and Aberdeen this is not the case. In terms of extractive practices there is some evidence for skilled maritime activity, but nothing that suggests a high degree of specialisation.

This evidence is difficult to resolve, but does not easily fall into the categories outlined in **7.1**. To attempt to understand the peoples of mesolithic eastern Scotland as a distinctively coastally-adapted group stretches the data too far. Biases may be significant, but rather than being the main focus of settlement, and the basis for stable aggregations of people, all of our available evidence suggests that the coast seems to have been a part of a wider inhabited landscape. Notwithstanding this, the particular character of its significance remains obscure. In order to examine this more closely a detailed case study of the Sands of Forvie, Aberdeenshire has been undertaken. Forvie is not representative of all coastal sites (such a site would be impossible to identify) but does provide a number of themes for wider discussion.

6.4: Case study: Sands of Forvie

'Let nocht bee funde in Furvye's gleby's
Bot thystl, bente and sande' (traditional)

The Sands of Forvie (Forvie, the Sands) are one of many archaeologically productive Scottish sand dune systems (Figure 97). Such systems preserve structures and artefacts, providing a rare zone of preservation in the lowlands. Forvie contains both types of evidence (see Kirk 1958; Ralston 1997). Flint collections are extensive, including antiquarian material, post-war collections, and more recent controlled exercises; much is held privately or a variety of British museums (*e.g.* Hawke-Smith 1980). Today, collection is still popular and many scatters are badly damaged as a consequence. The range of material is impressive, from formal barbed-and-tanged arrowheads and numerous thumbnail scrapers through crude waste to fine microliths and blade cores. As with any sand dune system there are important questions about the possibility of mixing of artefacts of different periods by deflation. I argue that at Forvie mesolithic artefacts are substantially *in situ*.

The Sands were selected as a case study for a variety of reasons. Firstly, a large assemblage collected by the Marischal Museum Young Archaeologists Club (MMYAC; Curtis & Curtis 1994) was available for analysis. This collection had good spatial information and some sampling controls, therefore offering an opportunity to assess the context of assemblages from the Sands. Furthermore, due to the absence of urban development to the north of the Ythan estuary, Forvie is the most accessible of the eastern estuarine sites, and offered the best opportunity for small-scale fieldwork following on from desktop analyses. Finally, at the initial stages of this research it was hoped that Forvie would form part of a larger study of the Ythan valley. Unfortunately difficulties with gaining access to material held by local archaeologists meant that this study was impossible, and consequently Forvie stands alone in this thesis.

Three stages of analysis have taken place. In January 1999 a non-metrical analysis of the 5787 MMYAC artefacts enabled the identification of a discrete mesolithic scatter as well as a range of expedient reduction techniques. Informal walkover surveys identified other discrete scatters and in August 1999 two weeks fieldwork enabled further assessments of spatial variation, obtained a sample of another mesolithic scatter (SOF99), and by survey, related lithic-bearing surfaces and middens to Ordnance Datum. Analysis of the 5353 SOF99 lithics was undertaken, alongside detailed re-analyses of the mesolithic scatter in the MMYAC collection. These analyses are discussed below, and full databases including catalogues of antiquarian material from the Sands is appended on CD-Rom. However, before progressing it is necessary to consider the very complex post-depositional processes at play in Forvie.

6.4.1: Sand

Today, Forvie is the fifth largest dune system in Britain, extending north 5km from the mouth of the Ythan to Collieston. Underlying the sand low glacial ridges, formed of rounded cobbles, rest on a bedrock plateau (Figure 98). The plateau is tilted, rising to the north, and bedrock is exposed in south-dipping cliffs running from Collieston south to Rockend, the northernmost point of Aberdeen Bay.

The history of the Forvie sandscape is inseparable from sea-level change. Regionally, sea-levels were lowest from *c.* 8300 BP, slowly rising after this (Gordon & Sutherland 1993). During sea rise, changes in river profile and lessened hydraulic effect led to estuarine sedimentation, depositing carse material in the estuary (Ritchie 1997). The main post-glacial transgression culminated at *c.* 4-4.5mOD soon after 6189±95 BP (Smith *et al.* 1983); after *c.* 6000 BP, relative sea-level fell and a series of mid-Holocene terraces formed in the estuary (D Smith, pers. comm.; Wright & Ritchie 1975). Whilst the sea rose, large amounts of offshore sediment were redeposited shoreward, and when the sea fell this was exposed. The combination of gentle offshore gradients, high winds and dry sunny conditions in this area are ideal conditions for extensive sand movement.[51] At Forvie the sediment began to encroach upon the low ridges at the river's mouth (Ritchie 1997) and since then waves of sand have swept across the landscape (Figure 98). The sand engulfed prehistoric settlements, and was found stratified to 1.8m deep below a later neolithic ring cairn (Ralston 1997: 30). Since this date sand accumulation has continued, overwhelming medieval field systems and settlements.

This implies that although a little sand accumulation may have begun during the latest mesolithic, following 6000 BP, the majority of the material *post-dates* the period, thus sealing mesolithic land surfaces and artefacts. It is these surfaces which are now being revealed in deflation hollows, implying that *in situ* mesolithic surfaces are being exposed. This assessment is also borne out by evidence on the ground (see below). Of course, it is possible,

[51] Beach forms are determined in part by tidal range and type. A macro-tidal range (>4m) on a beach with a low gradient will expose large areas of sedimentary material in each tidal cycle (Summerfield 1995: 321). East coast tidal ranges vary from 3.1m (Peterhead) to 4.5m (Firth of Tay). The off-shore topography is shallow, dropping to only -36m OD in nearly 8km in Aberdeen Bay (Crofts 1975). The combination of large tidal ranges and gentle beach gradients in the East provided an ideal context for sediment to be transferred from offshore to onshore situations. The present day climate of Eastern Scotland is also conducive to the formation of sand beaches, the area is dry and has long daylight hours in the summer (Ritchie *et al.* 1978: 9), thus affording time for intertidal sand deposits to dry, facilitating saltation.

likely even, that deflation zones have been created in this particular area throughout history and prehistory, and it is not possible to establish that *all* the artefacts on the surface were deposited in the mesolithic period, nor that all the mesolithic scatters were deposited at the same time. But it is clear that the mesolithic scatters themselves do not result from deflation processes. Although some at least, of the artefacts are *in situ* the possibility of small-scale movement must be retained, especially as this was noted to be severe during recent excavations (I Ralston, pers. comm.). This is particularly significant given the extreme dynamism of this sand-system; the MMYAC site collected in 1994 is now half-covered by sand. At a smaller scale, sand is constantly shifting, obscuring and revealing artefacts and even after thorough collection a day's wind can reveal further pieces. However refitting artefacts found throughout the MMYAC collection might suggest that minimal horizontal displacement has taken place.[52]

A consequence of the depositional environment is that many artefacts from Forvie are wind-abraded. The extent of abrasion varies, and cannot be assessed upon a simple presence/absence basis. Indeed a number of individual pieces demonstrate differential sand abrasion, suggesting that abrasion is intimately related to the micro-environment of the individual artefact, and of little chronological significance, as demonstrated by extensively abraded bottle glass. Abrasion makes macroscopic identification of secondary working difficult. Burin facets, in particular, are hard to differentiate from breaks and extensive edge damage from crude or light retouch. Problems also surround the recognition of heat-treated or lightly burnt artefacts, especially given that natural flints in northeast Scotland include reds. The greasy lustre sometimes associated with heated pieces is impossible to identify on abraded pieces.

6.4.2: Lithics

Before any detailed discussion is offered it should be noted that the Sands are large and complex and the surfaces examined form a tiny fraction of the total. However these are amongst the most productive surfaces currently known, especially for mesolithic artefacts.

The detailed study area is an extensive exposed old land surface immediately to the north of the bare-backed dune towards the tip of peninsula (Figures 99-100). The area is surrounded by dunes on all sides and is an extremely dynamic environment. The OLS has a cobble surface, with a notable sea-cliff to the south at *c.* 4m OD. Below this cliff the cobble surface slopes away towards the estuary. This area is covered in more sand than above the cliff. To

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[52] Given difficulties with abrasion it is impossible to assess how old these refitting pieces are.

the north the cobble surface fades into partly vegetated areas including possible relict soil surfaces. The cobble surface is presumably the glacial cobble ridge: it is comprised of compacted rolled pebbles of various types including lots of quartzites. Natural flint pebbles are found on the surface here (Figure 101), but do not appear to have formed a substantial part of the ridge itself, which does vary horizontally. The cobble surface, both below and above the sea cliff, is carpeted in struck lithics (Figure 102) and other archaeological features. The area below the sea cliff has fewer artefacts although some distinctively mesolithic pieces are found. The main scatters discussed are located above the MPGT sea-cliff, lying at heights just >4m OD and seem very likely to post-date the MPGT maximum, which culminated at *c.* 4-4.5m at *c.* 6000 BP.

The MMYAC site covers an extensive area (*c.* 120 x 65m) of broken terrain with many large stones and shattered cobbles that is now being encroached upon by the large dune. In one area collected during the MMYAC fieldwork a large stone is surrounded by knapping debris (Figure 103). This area is separated from SOF99 fieldwork by a low gully and the cobble-surface in this latter area is more regular in composition. A gridded-walkover survey of an area 50 x 70m was undertaken. Although artefacts were not collected records were made of the character and extent of lithics. This demonstrates an abundance of features; concentrations of lithics of different types, background scatters, and burnt stone features (Figure 104). These include distinctive round features of burnt and shattered stone. Feature A1 is a large exposure of burnt stone including *in situ* crude knapping at its edges; some of which refits. Feature A2 is similar, if larger and more diffuse. It includes greater quantities of worked stone. To the north, just beyond the survey area and where low sand cover is increasingly significant are a series of more-or-less discrete concentrations of burnt and discoloured pebbles. Six concentrations were identified, ranging in width from less than one metre to diffuse larger foci (Figure 105). In places these features were associated with *in situ* mesolithic flint knapping, and stratigraphically the knapping must post-date the burnt-stone features (Figure 106). Near these stone features are a remarkable series of concentrations of struck lithics: 11 discrete small clusters of flint that each appear to be the result of knapping one pebble; blades, chips and core of matching colour. The artefacts are relatively fresh, and patinated only on their upper surfaces. In places, they adhere to a dark soil found immediately above the cobble surface of the glacial ridge. This soil deposit is found extensively, if discontinuously on the cobble surface and is not found in the mobile dunes to either side of the deflation hollow. Unfortunately it is impossible to assess its character, or indeed whether the discontinuous deposit is a single phenomenon.[53] The distribution of material across the ridge is very

[53] Forthcoming fieldwork will obtain material for micromorphological analyses of this horizon.

interesting and the top of the low rise is comparatively free of artefacts. The exposed land-surface appears to be a relatively complete archaeological landscape with flint scatters and stone features, all arguably deposited after *c.* 6000 BP. There is, of course, some debate about the extent of deflation in this dune system and the possibility of deposition occurring discontinuously throughout prehistory.

One of the main foci identified during 1999 was to one side of a hollow on the edge of the sea cliff. The sub-circular hollow is approximately 6m in diameter. It is not clearly humanly constructed although it is hard to envisage a natural formation process. Parallel scoops or hollows are well known in the west; for example at Staosnaig, Colonsay where a circular hollow is interpreted as a hut floor (Mithen ed. forthcoming). Lithics were concentrated in the southeast of the hollow, artefacts lying within thin sand overlying cobble beach surfaces with discontinuous dark organic soil horizons. This was selected as a suitable location to sample, allowing an assessment of the relationship of artefacts to the cliff, an examination of a possibly anthropogenic hollow, as well as comparisons with MMYAC material. The artefacts have an interesting spatial distribution, discussed later, in the wider context of stone tool deposition (**7.5.1**; Figures 303-322).

The discussion focuses on two working traditions manifested over the two collections. The MMYAC material is divided into two traditions (MMYAC-1, and MMYAC-2) and SOF99 is comparable to the latter. The MMYAC assemblage can be sub-divided on spatial and technological grounds (Figure 107).

- Area A is a broad scatter of material, that, when the density of finds is considered appears to be a discontinuous 'ring' surrounding a central area. The scatter was bounded to the N by the presence of sand and might be incomplete
- Area B includes a series of small foci.
- Area C is a small discrete scatter of material.

The flint from Area A is the result of fairly rudimentary reductive processes, including bipolar knapping, whilst Area C (MMYAC-2) is dominated by blades, retouched tools and formal cores (Figures 108-110). Area A and Area C are differentiated by composition and location, and will be discussed individually. Area B is not distinct in character from Area A, and is incorporated into the discussion of A (MMYAC-1). It is possible that both A & B developed from repeated small-scale episodes of activity that in Area A have become a palimpsest.

Collection standards for both assemblages are high. The MMYAC methodology involved children collecting material from a *c.* 1m radius into individual labelled bags. A number of very small chips were collected and the assemblage looks very representative. The SOF99 material was collected by metre squares identified by eastings (100-107) and northings (100-119). Artefacts were not collected from the final 4m of the last 2 lines because this began to enter into another diffuse scatter. Sixty-one artefacts <10mm in size were recovered, with no bias towards individual collectors. The average size of artefact recovered by the MMYAC is a little larger than SOF99 (26.1±11.3mm, 23.4±11.2mm) but this small difference may reflect the character of the scatters rather than collection, as when controls[54] are placed on the samples and individual artefact types are compared, the MMYAC material is still larger. I have little reason to doubt that the samples are meaningful and comparable. Antiquarian collections have been catalogued, but are of little analytical use for my purposes (see CD-Rom). Quartzites were not systematically collected in either assemblage although 12 crude quartzite flakes from part of the MMYAC collection .

6.4.2.1: MMYAC-1

This assemblage includes 5184 artefacts and is dominated by waste resulting from pebble flint exploitation (Figures 111-113). Colours vary, but are dominated by shades of honey (39.3%) and grey (27.9%). Most of the pebbles appear to have been small and cortex is always very battered and worn. Flint-workers contended with many flaws; cavities, and a variety of unexpected fractures, in particular hinging, are common. As noted above, scatters of material surrounded large stones, possibly seats or anvils; one large anvil was found (E4) (Figure 112).

Thirty-three platform cores were recovered, dominated by flake removals. Seven showed some evidence of blade removals; one (ABDUA77007) was a fine pyramidal blade core. Other cores varied between single- or multiple-platforms; many were very irregular. Bipolar cores were common, taking distinctive forms (although these types were not quantified in preliminary analysis): many exhibited evidence for removals from both ends, presenting a 'splintered' appearance. Also common was a structured approach whereby after these initial removals the core was rotated through 90 degrees in the same plane, and struck again (Figure 114). This technique, which appears to be particularly suited to flat thin pebbles, produces distinctive negative scars on the core and artefacts. Many thin primary flakes result from this strategy and these are common in the assemblage. A variation was to utilise the cortex on the edges of the pebbles to provide a better platform for the blow. Some bipolar cores appear to

[54] By only examining artefacts greater than 10mm in maximum sixe

have only shattered at the hammer end. These present a distinctive wedge-like section and appear, misleadingly, to be a formal tool type, but seem likely to result from reduction strategies. Large numbers of primary flakes with a pronounced triangular cross-section are evidence of the bipolar reduction of elongated small pebbles. These often display evidence of an anvil at the distal end. Another technique leaves a strange, distinctive signature of chunky flakes, often with cortex extending all around their edges but with the dorsal and ventral surfaces exposed. This may result from the repetitive removal of material from one end of an elongated pebble (Figure 115).

High proportions of cortex on all artefacts demonstrate the importance of reduction processes. 91.3% of removals are cortical, and cortex is present upon nearly all cores (97% of cores, 97.7% of bipolar cores) Cortex is least likely to be found upon blades (64.3% of which have no cortex) and regular flakes (15.1%). No detailed record of percussive evidence was maintained but many bipolar pieces, and those assumed to derive from split pebbles show pronounced percussion ripples and lightly crushed platforms, both of which suggest direct hard-hammer percussion. In the glacial material at Forvie there are many pebbles suitable for hammers. The fairly simple reductive strategies have left a distinct legacy in the proportion of artefact types in the collection. Irregular flakes dominate (53.9%) and many of these betray evidence of a bipolar origin. Blades are a completely insignificant part of this assemblage (0.3%).

Very few items were retouched (n=13, 0.3%). They include a fine barbed and tanged arrowhead (ABDUA 76940; Figure 116), some edge retouched-knives (ABDUA74177, 77073) and a long convex scraper with cortical backing (ABDUA 75798). Two truncation burin/gravers are possibly mesolithic artefacts (ABDUA 76033, 73882). Many of the retouched items defy easy categorisation; a number of items exhibit small areas of retouch, and formal tool shapes are rather rare. These do not form a coherent collection and some mixing may be significant.

6.4.2.2: MMYAC-2

A total of 600 artefacts are found in MMYAC-2, which is very distinct in character from MMYAC-1. This scatter is clearly mesolithic; dominated by blades, with microliths, microburins and formal reduction strategies[55] (Figure 117).

The flint utilised differs from MMYAC-1: grey is more significant than honey and a distinctive pale-grey seems to have particularly favoured. Many pebbles retain battered and abraded cortex, suggesting a pebble source, but the flint is much larger than in MMYAC-1. This is indicated by the size of tertiary blades and distinctive large primary flakes, made on a lustrous flint found only in association with the blades. The assemblage is dominated by blades, with important proportions of irregular and regular flakes (Figure 118). Chunks are rare. Expedient reduction strategies are present, but in limited numbers and restricted locations.[56] Cortex is quite uncommon (42.8% of removals are non-cortical) but primary flakes are still important (15.6%). Production aimed at the manufacture of blades from formal cores and is testimony to high levels of skill (Figure 119-121). Careful routines of platform preparation were common, involving both platform isolation and scrubbing of overhanging edges on platforms (**6.4.2.4**). Detailed notes of bulb type were not made, but a variety of hammers were used, although indirect percussion was most significant for blades and flakes. Platforms were small and may have been varied for different purposes; a punch must have been used for many removals. The extent of control in the production process is also demonstrated by the consistent size of the blades and other removals (see below).

Cores were relatively common. Most (65%) have one platform and are based upon split pebbles. Removals rarely extend all the way around a platform, and only one core is non-cortical. Two cores (10%) have two platforms on opposite faces of the cores in opposing directions, both have a characteristic curving-wedge shape. One has been split and made into a core scraper (ABDUA75025). Some cores have hinging or other fracture difficulties. Some are remarkable; ABDUA73968 is worked all the way around a platform surrounding a large cavity in the flint, the platform edge is only 2-3mm from the cavity. A wide range of core rejuvenation material is testimony to skilled routines of stone-working (Figure 122). This included flakes struck in the same plane as the core face, either in the direction of removals, or in the opposite direction. In some cases it was difficult to identify a reason for rejuvenation, and some large flakes of this type may be mishits, with a strike deeper into the body of the core than anticipated. It is also possible that these heavy flakes were desirable in themselves. Two scraper rejuvenation flakes were identified.

Sixteen (2.7%) artefacts are definitely retouched and three have possible light retouch. The six microliths (Figure 123) are fragmentary and make little morphological sense.

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[55] Detailed metrical analyses of MMYAC-2 were undertaken after the initial assessment of the Forvie material. Some analyses are therefore not directly comparable to MMYAC-1.

[56] A few bipolar cores, and some primary flakes of honey flint are especially notable in areas A39, C11, C34 and K40.

ABDUA76960 looks like a broken triangle, but there is no break facet. It is very similar in size and shape to the fragmentary ABDUA79691, found in the same square. Other microliths include two long oblique truncations, removing the proximal end of blades (ABDUA75596, 76961) and a single truncation/rod found frequently in other scatters in the area (ABDUA74988). The two microburins are also unusual; both notches are crude, and made by a single blow rather than careful retouch. One core scraper was identified (ABDUA75025), but two scraper rejuvenation flakes were present. Two notches (and one possible) as well as three edge-retouched flakes are not distinctive.

6.4.2.3: SOF99

A total of 5353 lithics were collected from a total area of 152m^2. In contrast to MMYAC-2, where only one piece was burnt, 4.2% are burnt to varying extents; some appear to have been lightly heat-treated. Burnt material is concentrated in the centre of the scatter.

Most of the flint seems to have been derived from pebble sources, and these appear to have been medium-small in size. The largest single piece recovered is 104mm in maximum dimension but many bipolar cores have been manufactured on pebbles less than 50mm in maximum size. The flint ranged widely in colour on a continuum from red through pinks and tans to honeys and greys. One piece (3580) has some hints of reuse, it is an abraded regular flake with a small area of abraded retouch at the distal, and a fresh-looking inverse notch at the distal.

The assemblage is dominated by flake and blade removals (Figure 124). Irregular flakes are the single most frequent removals, these are often cortical and many are primary. In contrast blades are frequently tertiary (77.1%) and are much less likely to be cortical than regular flakes. 47.4% of all removals are non-cortical, and 16% primary. 91.7% of cores, and 86.3% of bipolar cores, are partly cortical. Flakes vary widely in size and regular flakes are often larger than irregular flakes; blades are longer than both. There was considerable control of production (below); preparation was common, platforms are often small and qualitative assessment indicates the significance of indirect percussion for blades and regular flakes although direct hard hammer (and ?soft) percussion was also utilised for varying stages of reduction.

Cores and core rejuvenation pieces indicate the careful structuring of blade production. A total of 79 complete cores were analysed: 61 (77.2%) have one, 16 (20.3%) two and 2 (2.5%) have three platforms. Cores are dominated by pyramidal or cylindrical examples developed on perpendicularly split pebbles (60.7% of one-platform cores): some are textbook morphological examples. Judging from the lack of cortical blades the first removals from these must have been flakes rather than blades. An important group of cores are those developing towards obliquely split pebbles. These broad, thinner pebbles are initiated by perpendicular, shorter removals across a broken face; this in turn is followed by removals of increasing length, increasing the angle of removal. Multi-platform cores vary in type: many are irregular or represent the addition of a secondary platform to a pyramidal or cylindrical core. A few blades and cores provide evidence of opposed platform removals but these are rare. Six 'two-platform cores' highlight the difficulty of 'static' categorisations of this type, as both platforms are in the same plane on a split pebble and may well have ended up *as* a single platform core if more cortex had been removed (although cortical areas provide useful handles). Most cores are cortical, but those with no cortex are the smallest. In many cases it is hard to assess the reasons for the abandonment of large cores although difficulties with hinging and (large) cavities or impurities were clearly significant. Rejuvenation strikes were utilised to solve a variety of problems – hinges, inclusions, cavities, and morphology – and took varied forms – tablets, opposed and parallel removals, rejuvenation tablets hit from different angles – the variety itself further evidence of the remarkably skilled and structured working at Forvie (see Figure 128).

Bipolar cores are significant (n=81). Most of are very small, developed on thin beach pebbles. The largest is 42mm in length and they average only 7±4.3g in weight. Many bipolar cores have been struck more than once (35). Of these 4 have been struck in the same direction, and 29 approximately perpendicularly to the first removals (two cases are impossible to assess).

A total of 120 (2.2%) artefacts are definitely retouched and 20 possibly (Figure 125). The type of retouch ranges widely, from confident abrupt microlithic alteration of morphology to very light alteration of the edges. Microliths and microburins are the most numerous. Of 39 microliths only 10 are complete. These are dominated by completely and partially backed rods (<5mm in width), with a few backed blades, although the division is somewhat arbitrary (Figure 126, 127). Some rods also have truncations and approach scalene triangles in type (see MMYAC-2). These microliths are all classically geometric later mesolithic types. 35 of the 38 microburins are notched on the left-hand side (92.1%). Most are small but some pieces have a reasonable length of blade before the notch (Figure 128). In two instances large microburins approach gravers (13, 2429). These have very large notches with unusual breaks. The microburins are dissimilar to those identified in MMYAC-2. As well as microburins there are a further 14 notched artefacts. The notches are light and fairly shallow and in five cases are inverse. There is also one denticulated piece (5203), a large flake with inverse irregular denticulate notches on left-hand side. There are two possible burins, each with a single spall from the distal and in two instances burin removals and retouch have been combined to create a graver of some kind (1560, 5053). 13 edge-retouched artefacts of various kinds are recorded. This diverse category includes a number of artefacts with light alteration of a shoulder of a flake: the impression gained is of a fairly disposable tools altered only for ergonomic purposes. The 8 scrapers are all convex (Figure 128), including a variety of types: end of blade and flake, short and thick. A distinctive 'shouldered' scraper edge is present on 4. Scraper rejuvenation is apparent on some examples but scraper rejuvenation flakes were not identified. All of the retouched artefacts are coherent with a later mesolithic date for the scatter.

6.4.2.4: Comparisons and Discussion

This range of lithic material raises important questions. Firstly it is necessary to consider the relationship between the structured production of blades and the more expedient bipolar tradition, most clearly evidenced by MMYAC-1 but present in both other samples, and widely distributed over the surfaces reviewed. Secondly the two discrete foci of blade working allow us to explore differences between two mesolithic scatters, both presumably deposited after *c.* 6000 BP and possibly before *c.* 5000 BP.

6.4.2.4.1: Traditions of working

The two stone-craft traditions described are very different and it is important to establish the relationship between them. At first it appears that they have been coincidentally juxtaposed and that structured mesolithic scatters lie in contrast to profligate traditions of stone working that may have been deposited later in prehistory. Certainly there is mixing of the assemblage types: both MMYAC-2 and SOF99 contain traces of the expedient industries; MMYAC-1 contains some elements of mesolithic working; and across the surface as a whole it is difficult to maintain any categorical distinction between the approaches. However, there are some difficulties with assuming that the expedient working is later in date, although it is impossible to resolve the question.

First it is interesting that bipolar cores make up very similar proportions of the two mesolithic scatters (1.5% SOF99, 1.8% MMYAC-2). These two scatters cover a similar area (*c.* 10m x 10m) and have such different densities of flint that it is difficult to see this consistency as a product of later mixing although, of course, a sample of two is not convincing. It is also significant that expediently worked material has been found in conjunction with two large burnt stone features A1 and A2. These features are comparable to one found in a stratigraphical relationship that proves it to be *earlier* than blade working. Of course, both burnt stone features, and crude working may have had a long life but this is suggestive of an early date. A striking aspect of the MMYAC-1 material is that despite occasional reuse of some patinated pieces and irregular flake cores, no blade cores are reworked in a bipolar fashion (ABDUA74562 is a rather doubtful exception). The MMYAC-1 tradition relies on the exploitation of very small crude pebbles, and it seems very surprising that discarded cores of good quality flint were not utilised in this situation. This seems to imply that the mesolithic cores were not available to the MMYAC-1 knappers. This might have been

i) because the mesolithic cores were later
ii) they were not aware of the presence of the cores (cores possibly buried by sand?)
iii) they deliberately avoided using the cores despite being aware of their presence (cores either contemporary or earlier).
iv) the cores were contemporary and part of a different tradition of working

These possibilities are difficult to assess but they cast some doubt on a later prehistoric attribution. If it is assumed that the bipolar working *is* later prehistoric it is necessary to explain why no blade cores were reworked.

Some parallel assemblages for expedient industries exist in the region, for example at Easter Hatton where the exploitation of pebble flint sources was reflected in an assemblage dominated by secondary waste and production debris (although neither to the same extent as at Forvie). Wickham-Jones (n.d. b) argues that the assemblage is very difficult to date but might be bronze age on account of the use of irregular cores and chunkier scrapers, the latter, we should note are absent from Forvie. Late neolithic and bronze age activity on the Sands has been demonstrated by excavation (Ralston 1997) and this suggests one plausible context for the scatter. But assemblages dominated by primary reduction and testing of pebbles occur throughout prehistory, and bipolar working can be mesolithic in date, and these early sites, *i.e.* Morton (J Coles 1971), Lussa River, and Jura (Mercer 1971) are often coastal, although the importance of quartz in these assemblages should be noted. The presence of 'splintered' pieces amongst the mainly mesolithic Forvie collections discussed by Hawke-Smith (1980) is a further indication of the local importance of these traditions.

These difficulties cannot be resolved at this stage and the date of the bipolar working is not clear. It is possible however, that it is broadly contemporary with the blade scatters, and that the bipolar tradition is another aspect of skilled mesolithic stone working: possibly a distinctive way of crafting small pebbles used for particular tasks in particular contexts. This is hard to assess, but may suggest the existence of a series of complex and subtle conventions surrounding stone-working and deposition in mesolithic settlements in Forvie. In order to assess these factors more closely I now turn to the two scatters of blade working: MMYAC-Area C (MMYAC-C) and SOF99.

6.4.2.4.2: Comparing like with like?

Despite being 'later mesolithic scatters' found within 100m of each other a series of similarities and differences can be identified between the MMYAC-C and SOF99 assemblages and these can be interpreted in terms of social reproduction. The similarities include, in a crude sense, the approximate size of the scatter (< *c.* 10m x 10m), the proportion of retouched material and the proportion of bipolar cores. Other factors are more complex.

Retouched tools

Despite similar frequencies of retouched pieces (SOF99 2.2%, MMYAC-C 2.7%) the first and most obvious difference lies in the characteristics of the retouched component of the assemblages. Although most marked in terms of microlith types, these distinctions run throughout retouched pieces. At MMYAC-C microlith types were rather irregular, but dominated by truncations and what may be unusual triangles (Figure 123). At SOF99 these are absent, and rods and sub-scalene truncated rods dominate (Figure 127). One rod with truncation from MMYAC-C is directly comparable to SOF99 but otherwise, the difference is categorical. This is difficult to interpret, microliths are poorly understood, and it is not clear whether variation in types reflects function or chronology, or indeed whether divergent craft traditions were significant (Finlay 2000; Finlayson & Mithen 1997). Hawke-Smith (1980) records triangles and rods from Forvie and Menie and a range of microlith types are known regionally. Although microburins are present at MMYAC-C these are unusual types, not comparable to the more regular left-hand microburins at SOF99. Indeed, the standardisation of these microburins, and the frequency of left-hand examples is suggestive of a habitual pattern of movement. Scraper types also differ, although the proportion of scrapers is similar in both scatters. A core scraper in MMYAC-C is not comparable to eight varied convex scrapers in SOF99, some with a distinctive shoulder (Figure 128). Scraper rejuvenation flakes are found in MMYAC-C, but not in SOF99 although scraper rejuvenation did take place in this area.

Colours of Flint

Varied honey and grey flints dominate both assemblages, but the use of other coloured material indicates some differences between the scatters (Figures 129-131). Although the proportion of material is generally comparable, one notable difference is that pink and red flints are also present in reasonable quantities at SOF99 but virtually absent from MMYAC-

C. Some of this may be due to the presence of burning in SOF99, changing the colour of the flint.[57] Burning has been known to give a red hue to flints, and the relatively high proportions of red chunks may be due to fire weakening and shattering flint. However red flint is available regionally, and some fine artefacts are made in red flint in SOF99. Therefore the difference between SOF99 and MMYAC-C, although possibly exaggerated by burning, may still be real. Pale-honey and light grey flints, often of a very good quality, are a small part of the industries although much more frequent at MMYAC-C than SOF99, as are many other varied colours.

The most noticeable difference between the use of different colour flint is the proportion of cortical pieces (Figure 129). The distinction between grey and honey flint in this sense is small, but honey flint is more likely to have been primary than grey on both sites. The main distinction is between honey and grey pebbles which are frequently cortical and red, pink, pale honey or white flint, all of which are dominated by tertiary pieces. This might suggest that some, at least of the reduction of the red, pink or pale honey pebbles is taking place away from site, or possibly, that the different reduction techniques leave different waste.

Different coloured flint is also utilised differentially in the two scatters, although the patterns are a little fuzzy (Figure 130). At SOF99 blades are more frequent on pale-honey, white or clear flint than they are on grey, honey or pink. Regular flakes are also frequent in pale-honey. Surprisingly, regular flakes are very frequent with pink flint, despite a low number of blades. Irregular flakes are rare in pale-honey or white flint, very frequent in honey. Grey flint, in general, is used for more regular removals than is honey. Red flint has a high proportion of chunks. However red, pale honey and brown flint are all more likely to be retouched than either grey or honey flint. The high proportion of red flint used for retouched implements is notable. Honey flint, despite generally being more irregular than grey flint, is more likely to be retouched.

At MMYAC-C blades are disproportionately frequent on light-grey, pale-honey and white flint and irregular flakes are very rare in these materials. Honey has fewest blades, and most irregular flakes. Cores are absent on pale honey, and white flint and only one light grey example is present – this is abandoned early. Grey flint is more frequently used for regular removals at MMAYC-C than it is in SOF99, although this may in part reflect the use of light grey flint and the difficulty of establishing categorical colour attributions. In any case grey flint is preferentially used for retouched pieces here, as opposed to honey at SOF99.

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[57] All analyses of colours are based solely upon fresh or abraded artefacts and should thus discount all burnt or heat treated pieces.

The various colours of flint also vary in size (Figure 131). Grey, grey-honey, honey-grey and dark grey flints are likely to be larger than honey flints. The size of many flints is very comparable between the two sites, honey and pale honey flints are almost identical on average. However on SOF99 red flints are the smallest, on MMYAC-C tan flints. Dark grey flint is the most notable difference, averaging 44.4±16.6mm in length in the MMYAC assemblage, only 24.3±7.7mm in SOF99.

These varied patterns are difficult to interpret, especially as flint pebbles vary internally in colour. However they are suggestive of some distinctions being drawn by the prehistoric stone workers. Both grey and honey flints appear to have been derived from (?local) pebble sources, and the differences in their treatment between the two sites may reflect changing characteristics of these pebble sources. Both materials are reduced on site, and waste is well represented. Grey flint is consistently larger: removals tend to be the larger ones; there are a fairly high number of regular flakes and a higher proportion of tertiary flakes than in honey. Honey flint is often small; flakes are often irregular and frequently cortical. Pale-honey, white or very light grey flint is a notable raw material. It is preferentially used for blades and is frequently retouched. There is very little cortical material of this type and only a small amount of production waste of this material. This is suggestive of patterns of procurement and reduction extending across the landscape. These are difficult to read, but offer an insight into the complexity of procurement and craft. Differences between the two sites indicate that these structures were not absolute, but allowed room for creative behaviour, possibly, for example establishing an exchange with a friend for the red flint when visiting.

Production

Varied analyses allow a number of statements to be made about production routines at the two sites. These demonstrate some surprising similarities between the two scatters, but other subtle differences.

A series of crude distinctions can be made at the very basic level of assemblage composition (Figure 132). MMYAC-C has a much higher proportion of blades than does SOF99 and slightly more formal cores. The SOF99 scatter has twice as many chunks as the smaller collection and has more regular flakes. Both have similar quantities of irregular flakes and bashed lumps and bipolar evidence. Both assemblages have similar quantities of primary removals, although SOF99 has a slightly higher proportion of tertiary pieces (Figure 133). This difference is not marked on blades, but is on flakes and chunks.

Although the sample of classifiable cores from MMYAC-C is small, both assemblages have similar quantities of cortical cores (MMYAC-C 95%, SOF99 91.7%). SOF99 has a much higher proportion of primary bipolar cores. Cores on both sites are dominated by single platform types, but multi-platform cores are a little more frequent on SOF99. Core sizes are broadly comparable, although those at MMYAC-C are a little larger (Figure 134).

Both sites are incredibly consistent in terms of the amount of platform preparation being expended on differing artefact type (Figure 135; for definitions see **7.1**). There are however subtle differences in platform widths. Platforms tend to be narrower at MMYAC-C, where a higher proportion of blades and flakes have platforms of 1mm or less, indeed at SOF99 regular flakes are more likely to have a 2mm platform than a 1mm platform (Figures 136-138). The width of blades is also quite consistent (Figures 139-140). Widths of complete unmodified blades cluster around 10-12mm on both sites, with a wider range of 9-16mm quite significant. Despite this similarity in width, blades in the SOF99 scatter tend to be shorter than in MMYAC and they vary in size a little more (Figure 141). Regular and irregular flakes are also a little smaller.

Discussion

This review has identified a number of areas of similarity and difference between the two mesolithic sites, summarised in Figure 142. Interpreting these varied factors is difficult, especially given some potential difficulties with the time period over which the scatters have accumulated. However some explanations can be offered. The similarities between the sites in terms of platform preparation, blade width and amount of cortex on blades strongly suggest that the two sites are closely related in terms of working traditions, and this is borne out further by general similarities between core types and core rejuvenation. The density of the scatters may suggest that the two sites may have been generated through different duration stays, and that the MMYAC-C scatter possibly results from a shorter stay than SOF99. This might explain the slightly larger cores and longer blades and regular flakes in the former assemblage. I have already argued that some of high quality pale-honey or light grey flint may have been obtained from off-site and it is possible that a longer stay (SOF99) might mean that blade length and blade core sizes dropped over time. The greater proportions of regular flakes on SOF99 may result from the use of these smaller cores with removals subsequently becoming squatter, and less likely to fall into a modern day definition of a blade. This may also explain why SOF99 has rather more tertiary pieces. Differences between the two sites in terms of raw materials are difficult to explain, but given poor understandings of mesolithic raw material procurement this should not occasion surprise. They probably came into being through individual networks and biographies, extended across the landscape in a number of ways.

The difference in microlith types between the two sites, despite the similarity in so many traditions of working, may indicate that the MMYAC-C stay involved the maintenance of a few specific tools, and the manufacture of some blanks and some trials. Whilst these tasks were important at SOF99 other processes were also in play, and with the longer stay a more stable fire setting became important. As we shall see (8.3) there are some hints of routines in the use of space around this foci.

The slight differences in platform width allow a series of explanations. It is possible that the smaller blade platforms on MMYAC-C indicate more controlled working, and that during the longer SOF99 stay a wider range of people have tried knapping. It is also possible that some of the mis-hit pieces can be interpreted in this context. However the differences in platform width on regular flakes are hard to explain in this sense and, to my mind, seem more likely to result from *slightly* different stone crafting skills. These very subtle differences picked up in a modern analysis are unlikely to have been acknowledged at the time, and the phenomena I measure today may have been generated by completely sub-conscious routines of movement inculcated during an agent's enskillment, possibly part of a family tradition for example. This interpretation also seems, to my mind, to fit well with the standardisation of the microburins and the presence of rather idiosyncratic scrapers.

Although these interpretations can only be tentative they do suggest that there is some complexity in the relationship between the two scatters. These differences are subtle but hint at bodily routines of working, differences in tasks and different networks of connection and mobility in terms of the procurement of flint. These differences do not fall into any simple interpretative model, but they demonstrate creativity within overarching structures and warn us against over-simplifying models of mesolithic stone working.

6.4.2.4.3: Lithics review

Two divergent stone working traditions have been identified at Forvie. The first is a relatively expedient treatment of smaller beach pebbles, frequently honey or grey coloured. The stone-craft is not without its particular routines and skills, and certain pieces are distinctive. This craft is difficult to date, but may be contemporary with more formalised mesolithic patterns of working on the peninsula possibly indicating differences in craft and routine.

As well as this, two distinct scatters of mesolithic blade craft have been discussed. Although superficially similar these can be picked apart to reveal differences within overarching structures. At one level, this can be interpreted in terms of the potential duration of engagement with the coast, at another it indicates differences between *people*. In both blade scatters there is further potential to pick at the edges of the data and by interrogating its generation identify the ways in which human lives may have been crafted at the same time as the stone tools. Spatial analyses of SOF99 (**7.4.1**) show some differentiation in the use of space around a central focus, possibly a fire, further hinting at subtle conventions surrounding social activities.

This analysis suggests we should be wary of simple explanations of the character of mesolithic settlement on the coast. Regardless of similarities and differences to other coastal scatters it is clear that the varied settlements at Forvie cannot be simply placed into a simple overarching analytical category without sacrificing important details and a way of analysing the creation of different contexts in prehistory. This should not occasion surprise; this is not a landscape to be inhabited by general imperatives, but by particular contexts. In particular these details may have been important in terms of varied social relationships played out at Forvie. In this study so far, by examining lithics evidence closely in terms of spatial and technological properties, particularly by reference to traditions of working rather than formal end properties, I have been able to discuss different settlements, some elements of which overlap, others do not. In order to be able to examine these contexts further we must step away from the lithic-bearing surfaces themselves and look at the wider Forvie landscape.

6.4.3: The wider mesolithic landscape

The Ythan estuary appears to have been an important focus for settlement throughout the mesolithic period. Mesolithic sites are known in the immediate vicinity of Forvie, for example a possible cave shelter at Mains of Waterton (Sneddon & Shepherd 1985), and further mesolithic material from Hill of Logie. Further up the Ythan mesolithic sites are recorded by Kenworthy (1975) and have been examined at Little Gight (Baird and Finlayson 1994). Finds have also been made near Ellon region and Newburgh, and large assemblages are recorded from Menie (*e.g.* Hawke-Smith 1980). These finds, although poorly understood, suggest that the landscape was frequently visited, seeing a further variety of places generated through varied action. In this sense, two questions are very significant: firstly, are there mesolithic middens at Forvie? Secondly, what was the character of the prehistoric environment?

6.4.3.1: Middens

The Ythan estuary has long been noted as the location of a range of middens (Jamieson 1868; Dalrymple 1868) but the location of many sites is not known (NK02NW 2, 4). Not all the middens are likely to be of mesolithic date, indeed many clearly relate to lower sea levels. This is especially important given the extensive use of mussel as bait for white-fishing in the late medieval and post-medieval period (**6.4.3.2**); the quantities utilised in this industry were enormous, and it is completely unclear where the shells were deposited.

Field observations reveal a great range of midden deposits at Forvie (Figure 100). The most significant are two features atop the MPGT beach (Figure 143-144). As part of fieldwork carried out in 1999 these were surveyed and heights above datum established by reference to OS datum. Heights were also established for minor midden exposures in this area.

Midden A is a low dome-shaped feature *c.* 20m across, eroding down the MPGT cliff-face at *c.* 7.4m OD (Figures 145-6). The top of the midden is pitted and irregular, rising to *c.* 9.2m OD. The erosion down the cliff face is serious, exacerbated by rabbit scrapes and a redirected popular footpath that cuts across the down-slope erosion face. The upper surfaces of the midden are not covered by sand. The midden is dominated by mussel, with a little winkle and cockle and stone.

Midden B is much more irregular in shape and is also eroding down-slope (height of MPGT cliff *c.* 6.5m OD; Figures 147-8). It has been badly affected by erosion. The midden itself is has a hollow centre and an irregular shape. The total length of the midden is *c.* 35m. Assessing the width of the feature is difficult because of severe down-slope and central erosion but may have been twenty metres. The midden is comprised of mussel with winkle, cockle and burnt stone. A single irregular cortical flake of beach flint was found on the surface of the midden.

Midden exposure C is a large eroding face of mainly mussel shell and burnt stone (Figure 149). It is suffering from severe slumping and a large number of false sections have been created in front of the body of material itself. The section is complex and fragile; without extensive, and damaging, cleaning it is difficult to assess the location of the bottom of the feature. The base lies at between 2.5-3.6m OD, probably at the upper limit of this.

Exposures D and E form part of the narrow beach terrace beneath the MPGT, and are not clearly anthropogenic. D is a low band *c.* 15cm thick of mussel and snail sat atop a fluvial sand/gravel deposit at *c.* 1.4-1.6m OD, sealed by a light loamy sand incorporating horizontal burning features. A further small lens of shell material is visible 25m to the east. Midden exposure E is similar (*c.* 1.3-1.5m OD), but more compacted than D and does include very occasional shattered stone (?burnt) in its lowest layers. It is sealed by a fine layer of gravel.

The middens cannot be interpreted in isolation and it is unfortunate that the early records are so vague. Jamieson (1868) commented that flints were found in association with middens on both sides of the estuary, although more frequently to the north. Middens to the south are set upon accumulations of blown sand and are therefore unlikely to be mesolithic in date, although the difficulty of distinguishing blown sand from raised beach material should be noted (Ritchie & Mather 1984: 22). Dalrymple's account (1868) is also ambiguous. Middens, 'some of considerable extent', were noted on both sides of the estuary, at varying distances from the water. His detailed comments are on those to the north and he excavated two.

The first lay close to the high-water mark and measures 150 x 30 x 15-16ft. A complete 'perpendicular' section was made through the midden, revealing that the midden rested upon an old beach surface (3ft above present high water) which was covered with one foot of pure blown sand. The midden was comprised of 10ft of burnt shells and sand strata of 'cockle, muscle (sic) and winkle' (ibid. 424) with a fireplace containing burnt stones. No artefacts were discovered and 4ft of sand covered the mound. This may equate to Midden C. Assuming that the 'southern extremity' (Dalrymple 1868) of the peninsula is the mouth of the Ythan, the midden should be located 1½ miles from the mouth at high or low tide. Assuming stability in the location of the mouth of the Ythan, this distance at low tide would be entirely consistent with the grid reference of NJ00792555 obtained by survey in 1999. Further details of Dalrymple's account are also broadly congruent. The base of the large layer of shell is at *c.* 10ft above sea level (comparing to 3.5m obtained by survey) and the exposed section is within metres of the high tidemark. The midden is located below the MPGT limit (**6.4.1**) and is presumably not mesolithic.

The second midden lay at one of the lowest points of the peninsula (ibid.) half a mile from its southern extremity. The ground surface is 'hard old beach' at 6-8ft above the sea. In the area of the mound are 'numberless flint chips' although their relationship to the midden is not clear. The mound is an 'irregular horseshoe' 90yds long, 8-10yds broad and 5-6ft in depth, comprised of shell deposits separated by layers of clean sand at least 1ft deep. In the upper shell deposits central depressions appear to have been fireplaces, deer and 'ox' remains were identified. Sealed by 16 inches of clean sand under the midden was a hearth, the bones of 'large animals', charcoal, a bone 'polished and sharpened as if for use' and a fragment of corroded iron (Dalrymple 1868: 426). A burnt 'rude stone celt' was found on the surface of the midden. This site is difficult to interpret, but may refer to a midden on the low beach surface to the south of the large bare-backed sand dune. Middens and lithics are relatively frequent on these surfaces. This midden is also hard to date, but given the presence of iron sealed beneath it, is very unlikely to be mesolithic. It quite clearly does not refer to the location of either Midden A or B.

Indeed it is these two middens atop the MPGT beach that are of most interest. This relationship might imply that the features are of mesolithic date, but it is difficult to ascertain this with any confidence. Morphological criteria are hard to use, especially given erosive problems. The position of the Forvie middens, right on the forward edge of the raised beach is also inconclusive. Pollard (1996) states that most west coast middens sit to the rear of a raised beach but the middens of the Forth seem to sit on and slump down the MPGT sea-cliff (Sloan 1993). In any case it seems unlikely that the middens *pre*date the transgression. The composition of the middens also offers few clues to their date. Without excavation it is therefore impossible to date these features although the possibility that they are mesolithic still remains. Further analysis of these middens is an important area for future research. In any case, we might note that if these *are* mesolithic features, they are small.

6.4.3.2: The environment

The Ythan always had a long estuary, protected from the sea by the ridge of material at Forvie. Large amounts of sediment, deposited as sea levels slowly rose from *c.* 8300 BP, created a variety of salt- and fresh-water marshes in the estuary. Early phases of a pollen core from Waterton (Smith *et al.* 1983), indicate damp freshwater habitats – willow, meadow sweet, reeds, sedges and grasses. Pine, birch, elm, and hazel were present, probably on the drier slopes. After 6850±140 BP (SRR-1565) oak joined the woodlands and alder became slightly more significant, the former reflects regional vegetation developments, the latter possibly an increasingly damp environment, possibly human activity in the area. As sea level rose, salt-marsh became more significant, *Artemisia*, *Chenopodiaceae* (goosefoot family), *Plantago maritima* (sea plantain) and *Caryophyllaceae* (chickweed family) were present. Forvie was likely to have been a dry, relatively well-drained ridge in a lightly wooded environment above a rich estuary. No reliable pollen records exist for the duration of the transgression, although mixed woodland likely remained significant in the area.

As noted above, long beaches are monotonous landscapes, but estuaries support a much wider range of flora and fauna. Not only is Forvie a rich estuary, but it is located within easy walking distance of distinctive rocky cliffs. Today, Forvie has one of the highest habitat diversity ratings in Scotland (Ritchie & Mather 1984), reflected in its status as a National Nature Reserve. Forvie is famous for birds. 225 differing bird species are known today, 43 are regular breeders, creating a notable seasonal rhythm (SNH 1994, Davis & McDonald 1996). In the summer for example 5,000 eider ducks are joined by four species of tern (sandwich, little, arctic and common). In winter the estuary becomes home to migrants from Iceland, including *c.* 30,000 geese (mainly pinkfeet), as well as whooper swan. Other winter birds include waders, especially near Inch Geçk where flocks of over 1000 birds can be seen. Major species include golden plover, dunlin and redshank as well as greenshank, knot, ruff and bartailed godwit. Resident species include a large flock of mute swan as well as shelduck, curlew and oystercatchers. Wildfowl include mallard, teal, goldeneye and longtailed duck. The rocky cliffs to the north provide a 'summer haven' (SNH 1994) for herring gull, kittiwakes, fulmars and razorbills.

As well as birds a variety of insects, terrestrial and marine animals are significant. As well as the range of plant types noted above other characteristic fauna of the area include the edible sea lettuce (SNH 1994) and a variety of edible plants. The wealth of this environment seems likely to have attracted a variety of herbivores; deer are well represented in the bones discussed by Dalrymple (1868).

Salmon and sea trout are the most significant fish in terms of contemporary human activity (6). The estuary is famous for sea trout and annual catches of 3-5000 trout alone were commonplace at the turn of the century (Walker 1997: 126). Sport fishing is very popular today. Presently mature trout enter the estuary from mid May, increasing in numbers throughout the summer and then moving upstream to spawn in mid October-November. Salmon appear in the estuary throughout the year but peaking in the summer, spawning a little later than the trout, in mid-November-December. Other species of fish include pike, rainbow trout, flounders, eels, lampreys, minnows, three-spined sticklebacks, mullet and sea bass (Walker 1997). Fish are ever present in the estuary, but the best fishing times are summer and autumn.

Shellfish are common and numerous species are known, including cockles and mussels, the abundance of the latter is famous. The quantity of shellfish present in the estuary is indicated by its use for bait. From the seventeenth century until the advent of trawling in the early twentieth century mussels (in particular) were used to bait long-lines for white-fishing (Coull 1996: 49). This 'daily baiting of thousands of hooks by (an) individual woman' utilised as many as 2400 mussels per person, per day (ibid. 82). The Ythan estuary was recognised as one of the main sources of bait in the east, but by the nineteenth century it was recognised that the estuary was badly depleted of shellfish, and restrictions were made (ibid. 98). Mussels, cockles and winkles are found throughout midden deposits in the area.

Forvie is a remarkably rich environment today but it is necessary to question its uniqueness in a historical context. Part of Forvie's wealth is connected to the minimal human interference in the estuary after sand accumulation whereas other river estuaries have become foci for major settlements. It seems likely that the especially rich character of Forvie partly reflects the loss of these alternative estuaries for migrating birds. However we should also consider that migratory numbers of fish and birds are likely to be very much lower today than they were before 10,000 years of hunting and pollution. Forvie, even if not as *uniquely* rich as it is today, would still have offered much to prehistoric communities.

6.4.4: Interpreting Forvie

With this framework we can begin to think about a range of human activity carried out during the late mesolithic at Forvie. All of the different activities discussed above created different associations with the Forvie landscape, maintained over varied time periods.

Some may have generated crude scatters from small flint pebbles as they hacked away at a large catch of fish. Others, perhaps, built small middens of shell over the seasons. Possibly feeding themselves in a hard season, possibly baiting lines to be played out on the log boats made from the trees found further inland – away from the stunting salt spray. Some may have stayed for a short time on a windy peninsula above marshes. Others possibly stayed in a rock shelter further back from the sea. For still others, a fire provided a focus for their stay, possibly in a light structure occupied over a little time. Some worked stones in slightly different ways to others, resting the cores on their legs in distinctive ways, methods possibly picked up upon by their kin in turn. Some visited for the fish, and perhaps at these times larger gatherings, and longer stays were possible. Others passed through to collect flint; stopping briefly as they travelled to repair a few distinctive tools and gather an evening meal. Some folk worked in some areas, others elsewhere. At times these distinctions were rigid, but in other company play could be made of these practices: crude impressions and laughter stopped anyone being too sure of their importance. Sometimes the fireplace provided a focus for stone working and the careful manufacture of blanks for tools to be used later in the year: warm hands were important if you were to feel the weights of the flint properly in your hands. These blanks, when pulled from a leather bag high on the hills, might remind someone of an argument or a tale shared around the fire. A distinctive scar on the core caused by a knock on the shoulder from a kinswoman's child, too inquisitive to see how the play of arm and leg, wrist and shoulder, and punch and hammer resulted in the ringing removal of a fine blade. Other tasks on the low ridge above the marsh: scraping, cutting and piercing, did not feel the benefit of the glow of the fire as strongly. Some areas may have been associated with particular groups, families, or age sets. Some places may have been linked to tasks, such as the processing of smelly shellfish when the stench from the mounds would take days to remove from your clothes. Some visited the Sands from the north, from the south, from the west. They carried with them a few pebbles of fine dark grey flint, exchanged in return for a song and a tale. Most had been here time after time, and no two times had been the same.

6.5: Discussion

In the light of my argument in this chapter, and throughout this thesis, to move from the detail of Forvie to generalising statements about the character of the mesolithic occupation of the coasts of eastern Scotland would not be appropriate. General models of the European mesolithic that stress the importance of the coast in terms of resources and so-called 'complexity' do not do justice to the character or the potentials of the data from Forvie, which is testimony to variation, and enables us to think about how people may have engaged with the landscape. Forvie is not unique in this regard, as the evidence from Morton is also suggestive of a series of different activities taking place on the coast rather than one homogenous 'coastal society'.

Most attempts to characterise the 'type' of site that Morton is have unified the site, treating it as an aggregate based on total quantities of artefacts (*e.g.* Mellars 1976a). But Morton is actually a complex series of superimposed settlements, varying in date and also varying dramatically in terms of lithic and structural evidence. Although the data is hard to extract from the various tables (J Coles 1971) some differentiation can be identified at the level of raw material types, proportion of retouched and utilised pieces (Figures 150-153) in different places. At T44/47/55/56.I for example, there are very few signs of primary flaking of any material (ibid. 337). At T44/47/55/56.VI there is no use of Group 3 materials, 10.1% of all pieces are retouched, and 17.4% utilised whereas at T46.V-VI Group 3 materials comprise 31.25% of the raw materials, 4.2% are retouched and 6.3% utilised. Regardless of potential differences in date, these demonstrate that a range of activities took place during differing stays at Morton, and that these settlements are *not* all comparable.

Thinking more widely, there are similarities and differences between Forvie and other coastal sites. Some are small, some are located on hills above estuaries; but other people chose other coastal locations. Some have many crescentic microliths, others demonstrate bipolar working of pebbles. Some may have been important for flint, others for birds, or fish. In some places these different associations could overlap, and visitors could pass through at different times of the year, in different groups for different reasons. And of course, the coast itself changed over time. Sea levels slowly rose and fell, although the local manifestations of this could be much more dramatic than the long narratives of our chronology. There were disasters. Bad autumns when the floodwaters ran and ran. High storm tides that shifted sand systems, sometimes blocking estuaries, and of course, at one stage an eight metre high wave crashed onto the coast. And there were other time scales, of the tides ebb and flow, the cycles of the moon, and of human growth. Occupation of the coast incorporated all of these varied rhythms and a range of skills that developed in these contexts. The coast was very important to the mesolithic communities of the east but the ways in which this significance was manifested varied greatly over time, and between individuals. We cannot, and should not, simplify this range of associations in order to discuss a crude 'mesolithic coastal landscape'.

Chapter 7: Working with stone

> 'The process of tool fabrication ... which was essential for both the physical and ideological reproduction of ... societies, is today divided into as many conceptual segments as there are archaeological specialisations.' (Pétrequin *et al.* 1998: 278)

In this chapter I discuss the ways in which stone-tool manufacture may have been implicated in social reproduction in the mesolithic. Rather than focus on one detailed aspect of lithics I examine stone-craft as a total social phenomenon, identifying structures that may have enabled certain types of behaviour, and highlighting the ways this contributed to the possibility for action in the past. I begin by outlining my approach to the material and reviewing the raw material types available before discussing the procurement, production and deposition of lithics.

7.1: Lithic analysis

The collection, curation and description of lithics over the past two centuries has been fundamental to interpretative engagement with human lives in the past. And yet we are somewhat reticent about our use of this material: lithic analysis remains obsessed with technological or typological matters, and there have been few attempts to develop interpretative or analytical approaches that explicitly address social relations.

The study of lithics often stresses formal properties in the construction of varied analytical typologies (Adams & Adams 1991; Brown & Edmonds 1987: 2; Clarke 1978; Dunnell 1986; 1993; Klejn 1982; Wylie 1992). The belief that the external form of an object is significant is central to these analyses, as it is taken to be a signifier of participation in a culture. 'The artefact is the focused result, directly correlating a whole set of actions, sequences of actions or behaviour necessary *to materialise the abstract conception in the makers mind*' (Clarke 1978: 153 my emphasis; see also Grace 1997: part 1; Klejn 1982: 41; Figure 154). Possession of this template is definitive of participation in culture and although the actualisation of the template is affected by raw materials, what is of interest is the ideal form. Klejn, for example, argues that 'typology draws its support from what is repetitive and stable and steers clear of what is individual and fugitive' (1982: 79).

Three points are significant. First, it is a particular characteristic of modernity, and modern science, to consider a good technology to be stable, repeatable and predictable in its outcomes (Simmons 1997). Instead of understanding skilled behaviour as the ability to react/adapt to a situation, the logic of the production line implies the ceaseless enactment of a blueprint.[58] Secondly, if participation in archaeological culture is dependent upon possession of a mental template then given that many typologies are erected upon the basis of variation in a small range of formal tooltypes this must imply that our definitions of culture are similarly restricted. An archaeological culture conceived of in this fashion only involves those making formal tools of particular types. Recent critiques of artefact analysis have suggested that the dominance of formal tool-types in analysis creates a zone of male dominance in the past (Gero 1991). In fact, the template-based conceptualisation of culture *actively denies* participation in an archaeological culture to those not associated with the production of distinctive artefact forms. Thirdly, obscuring or labelling variation is not innocent. A normalisation of culture removes any possibilities for our histories to articulate contested meanings.

In distinction to a normalising, modernist approach I suggest that manufacture and technological behaviour are the outcomes of a complex of interactions between an individual, their skills, routines of bodily movement, the task in hand and the material world surrounding them. An artefact is not firstly a product of a template, but arises from repeated *actions*: the quick strike of a hammer, an application of pressure, holding a stone to cushion the blow. An artefact's final form may be quite standardised, but this is the *outcome* of these movements and skills (Ingold 1997b: 112) which are not blindly inherited, but *learnt* – passed down from generation to generation in a process of 'guided re-discovery' (ibid. 111). Stability in the formal properties of a tool type can therefore be understood by stability in the skills utilised by individuals, and beyond this, a wide variety of tool types may be linked by the skills embodied in their forms. This implies that the proper study of lithics is the attempt to study the skills and routines of working that generated the scatters that we now analyse.

In the analyses that follow, and in those already presented from the Sands of Forvie, I aim to identify structuring principles that facilitated the generation of prehistoric stone working. This is not to argue that these are rigidly fixed rules of behaviour, but to maintain that they are *potentials* for certain kinds of action. I utilise a 'soft' *chaine opératoire* in the attempt to consider how these structures of stone working relate to social reproduction in a wider sense, examining procurement, manufacture and deposition. I do not examine the use of stone tools, because the character of the assemblages is such that microscopic analysis of use-wear is unlikely to be rewarding. Those from the Tweed are often heavily damaged by the plough, those from Forvie highly sand-abraded. It is, of course, difficult to be specific about some factors, any account of this type operates at a certain level of generalisation; but the analyses succeed in opening out the potential and complexity of the material.

My main focus in discussing the procurement and production of stone tools is on the later mesolithic Tweed Valley whilst the review of stone tool deposition covers a wider area. The Tweed valley offers rich potential for analyses of this type as three easily distinguishable raw materials are utilised in most industries in the area. My analysis is necessarily comparative, and I focus upon the differential use of these materials, examining the structure of assemblages as well as core types and the presence of platform preparation. For a preliminary analysis of this type, intending to establish the viability of an approach, my classifications are fairly simple: platform preparation is absent, simple or complex. Simple preparation is platform isolation or scrubbing; complex preparation refers to faceted platforms.

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[58] The Cartesian separation of the physical and mental in these analyses is characteristically modernist.

Unfortunately, due to the variable fracture qualities of the raw materials it has not been possible to analyse bulb types for comparative percussive evidence. Studies of this type were made at Manor Bridge and the Dookits, but in the absence of experimental work their interpretation is difficult.

I examined material in the NMS and private collections from Craigsford Mains, Dryburgh Mains, Fens, Kalemouth and Rink as well as a range of sites in the upper Tweed Valley from the Knox collections; some of which were excavated in order to obtain controlled samples of lithic material. A detailed account of the Tweed Valley material is in Appendices **2** and **3** and the databases are included in the CD-Rom appended. Some of these are large problematic collections and there are clearly sampling difficulties, however I felt that it was necessary to try and use this resource in a way that was not solely reliant upon type-fossil analysis. The results are provocative, if not conclusive. There are difficulties in establishing some comparisons: the excavated sites lie mainly in the upper valley, the antiquarian collections further downstream, but the distances are not large, especially given a mobile population. The upper valley sites are often small whereas those in the middle valley are larger, and quantified comparisons are not always possible. Many of the collections are also likely to be palimpsests and analysing, for example, the structures underlying mesolithic stone working at Rink is likely to obscure important variation. At this stage these problems cannot be avoided but the studies demonstrate the potential of the approach; further research will undoubtedly bring these matters into clearer focus.

7.2: Raw material types

Although sources of large, high-quality flint are unknown in Scotland a range of materials were suitable for stone-craft in prehistory, from crude quartz through varied volcanic deposits, and bedded cherts to redeposited flint gravels (Wickham-Jones 1986). For the purposes of this discussion it is not necessary to review all the available materials, as Tweed assemblages are dominated by cherts, flints and chalcedonies: other materials, such as agates, jaspers, mudstones, and quartzes are usually a small part of industries. Generalised statements about raw materials cover many areas of uncertainty. An examination of the flint content of any museum's storeroom soon reveals unusual colours, or unexpected pieces.

Although chert has a clearly established meaning in British geological literature there is some confusion in archaeological discussions, especially given American descriptions of all silica rocks, including flints, as cherts. The physical characteristics of chert, flint and chalcedony are all based upon the crystalline structures of silicon dioxide (quartz), which takes various forms in its hard mineral state. Microcrystalline forms are either needle-like (flint, chert) or more fibrous (chalcedony) (Andrefsky 1998: 51ff; Whittaker 1994: 67ff). Conflicting descriptions of these materials exist within the geological literature – Cox *et al.* (1974: 204) define chert as composed of microcrystalline quartz *and* chalcedony – and confusion carries over into the archaeological literature. The Dictionary of Archaeology (Bahn ed. 1992), for example, defines both flint and chert as members of the chalcedony group of minerals. These complications can create some problems in comparisons of site reports, with descriptions of 'cherty-flint' (Henson 1982) or grouping chert and chalcedony together as Wickham-Jones (n.d. a) does in her account of Springwood Park. This is unfortunate because in a Scottish context chert, flint and chalcedony are distinct materials, created at different times by different processes and with different physical characteristics.

Archaeological classifications of raw materials will not be identical to those of prehistoric stone-workers. Our descriptions of chert, flint and chalcedony make reference to the depositional environment and formal microcrystalline properties of the material. Both factors are unlikely to have been understood in these terms by prehistoric populations, who likely classified their material according to a rather different series of requirements. As Pétrequin *et al.* note (1988: 282) 'the criteria of choice considered by blade producers in Irian Jaya are far more detailed than those used by Western geologists'. Many definitions of raw material also include more aspects of that material than those recognised by western science. In Western Arnhem Land, for example, quartzite 'was considered to the petrified remains of the bones of certain ancestral beings. The completed bifacial points and unifacial *lauwk* points were made more powerful and effective in hunting and warfare as they were seen to contain the essence of the creatures that formed the sites' (Taçon 1991: 197-198)

Quartzite's shimmering, iridescent aesthetic properties may have been especially significant as 'brightness' was considered to be a property of life and ancestral beings. Varied crystals and stones are also held to have spiritual properties in contemporary metropolitan society. The details of belief will, rightly, remain obscure for prehistory, but such phenomenon are likely to have been very significant in structuring behaviour in the past. Too often, our accounts of prehistory have been dominated by a misguided common-sense approach – at times, these comfortable analyses may require a little nudging.

7.2.1: Chalcedony

Chalcedonies are the least known of the raw materials discussed here. Chalcedonies in the Tweed valley range greatly in colour, from white through oranges and pinks to purples; all with occasional clear patches. Chalcedony has a fibrous crystalline structure, opaque or waxy appearance and in most instances the material is macroscopically distinct from local pebble flints, and in terms of crystal structure is categorically distinct (Jim Floyd, BGS: pers. comm). Chalcedony is nearly always distinguishable from chert.

Chalcedonies form in volcanic rocks when water solutions with silica and other minerals fill gas bubbles in the parent material. In its primary form it has a waxy lustre and a 'mamilated' botryoidal surface (Henson 1982: 7ff). Most of the colour in chalcedony comes from the minerals, especially haematite, which is the most common. Differences in deposition and mineral content mean that chalcedonies merge into jaspers and agates. Due to a lack of recent geological research in the region little is known about where these materials were deposited, but a source in the Devonian volcanics of the Cheviots is likely although the Carboniferous Kelso Traps are possible (J Floyd, pers. comm.). Most of the archaeological material is likely to have been found in secondary contexts, such as rivers, and chalcedony is very durable in them. These sources are broadly in keeping with the areas where chalcedony forms a significant part of the mesolithic industries.

7.2.2: Chert

Although chert is found in varied deposits throughout Scotland (Wickham-Jones & Collins 1978) this discussion focuses on the 'superabundant' cherts (Finlayson 1990: 44) of the

Southern Uplands – often the dominant raw material on mesolithic sites in southern Scotland. Southern Uplands chert (SU-chert) is a microcrystaline silica with a low water content. It is sometimes called radiolarian chert because of small identifiable fossils (radiolaria) in some examples (*e.g.* Danelian & Clarkson 1998) but not all SU-chert is radiolarian. SU-chert dates to the Arenig and Llandeilo periods, early in the Ordovician (*c.* 505-438 mya) and chert is therefore considerably older than most British flint (see below). The colour of SU-chert varies according to mineral composition, but most are fairly dark. The characteristic blue colour is due to the presence of ferrous iron which oxidisation transforms to rusty-red (Sargent 1929: 403). Many cherts in the Peebles area have a blue-grey or rusty colour, often both colours on one piece. Grey or black is due to the presence of sulphuric metals. At times a distinct thin shale interface deposit differentiates chert from surrounding shales, this is often a light tan colour. In the discussions following this is described as cortex.

The deposition and formation of chert has been a matter of some controversy, but rare earth element analysis suggests that the formation of SU-chert took place in deep-sea environments at the continental margin (Armstrong *et al.* 1999; Owen *et al.* 1999) as part of a succession of deposits of greywackes, shales, mudstones and cherts (MacAdam *et al.* 1993).[59] Because of this depositional environment chert varies greatly in quality and cherty mudstones are also common. The chert was uplifted from the ocean floor when England and Scotland collided during the Silurian period (Gillen 1995a; MacAdam *et al.* 1993) and since then overburden has been removed through repeated erosive episodes, especially in the Devonian period.

It is necessary to distinguish between primary and secondary sources of chert. Primary outcrops are found in a broad band running SW-NE in the upper Tweed Valley (Figure 155). The chert outcrops as thin, undulating bands rarely greater than 10cm in width and often much less. There is considerable local complexity to its appearance, at Hawkwood for example tightly folded red-brown radiolarian cherts, with quartz micro-veins pass upwards into well bedded blue-grey cherts, above which lie grey shales with two black chert beds (Danelian & Clarkson 1998: 134). The exposure of chert at the modern day surface has removed considerable and very long-lived pressures from the rock, and as a consequence it tends to shatter during expansion. Freeze-thaw actions and chemical weathering also affect the material.

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[59] It is noteworthy that REE analysis offers some potential to differentiate and provenance archaeological cherts.

Many secondary deposits of chert are testimony to the long history of erosion and glaciation of the Southern Uplands. Chert is found in varied deposits: screes, terraces, within many soils and in the modern river. Some terraces date to the last glaciation. At Sherrifmuir (Rhind 1968: F.216) abundant chert clasts are found in plough soil in a large terrace and nodules can be collected from the junction of the Meldon and Lyne beneath this terrace (Wickham-Jones & Collins 1978). At Clashpock Rig a large (?Lateglacial) terrace in an area of abundant outcropping chert is also very rich in material (Figures 156-7; see below). Chert in these secondary sources varies in colour and quality, but some is good enough to work.

7.2.3: Flint

Although *in situ* flint deposits are unknown in Scotland (Wickham-Jones & Collins 1978) derived flint gravels are known in the northeast. The Buchan gravels contain redeposited flint pebbles; outcropping immediately beneath the modern land surface (Gemmel & Kesel 1979) and in the surrounding area tills and other soils contain high quantities of flint. The flints themselves contain fossils dating to the Cretaceous period (*c.* 144-65 mya) and have been redeposited by some geomorphic agency, presently unknown, from an unknown location. The date of deposition is also unknown but it may lie in the Pliocene or early Pleistocene (*c.* 5-1mya). At Den of Boddam prehistoric flint quarrying is attested from at least 3500-3000 cal BC (Saville 1994b), and further quarrying has been identified at Skelmuir Hill. The pebbles in the Buchan gravels vary in size, stated to range from 90-125mm in diameter (Wickham-Jones & Collins 1978: 9) to as much as 180mm (Saville 1994b). Buchan flint also varies in colour, from grey through red, brown and yellow. No simple attribution of source on the basis of colour is possible and there may be significant horizontal variation within the deposits.

Beach flint deposits along the eastern coast are mainly derived from sources under the north Sea (Gemmel & Kessel 1979). Grey and yellow flint is the most common although small amounts of black flint are known from Rattray Head in the extreme northeast. Given changes in sea level and marine processes it is very difficult to assume that the presence of flint resources on the coast has remained stable. Occasional flint pebbles can also be found in derived contexts a little further inland, for example in alluvial deposits near Morton (J Coles 1971) and in kame deposits near Berwick (Wickham-Jones and Collins 1978). Much of this secondary material, from beaches or from other deposits, tends to be in the form of small battered pebbles, of varied quality. Further deposits of beach pebble flint are known on the west coast of Scotland and it is possible that material from this area is finding its way up into the Tweed Valley. Yorkshire Wolds flint is also sometimes mentioned in discussions of raw material movement in northern Britain (Henson 1982). Flint is found in chalk and till deposits in the Wolds, natural exposures are rare except for at Flamborough Head and most exposures are secondary. Till flint is the best quality (Henson 1982: 86); as a general guide chalk flint may be white, 'cherty' and opaque with diffuse cortex whereas till flint may either be red or grey. The latter is commonly grey, black-brown or translucent with small inclusions and very well defined cortex.

7.3: Procurement

> 'It must be remembered that mesolithic peoples (in Scotland) would have been colonising an extremely erratic rich environment in early post glacial times - the first pickings would have been theirs' (Saville 1994:66)

> '... mesolithic sites (in Scotland) exhibit a very wide range of raw material use. It is clear that nearby beaches, river beds, gravel exposures, and appropriate rock outcrops were being searched for any flakeable stone.'(ibid. 59)

The slight tension between these comments serves as an appropriate introduction to a surprisingly little known aspect of mesolithic lives. For despite the dominance of stone tools in our analyses, our understandings of raw material procurement are limited and the publication of the extensive work on raw material procurement undertaken by the Southern Hebrides Mesolithic Project is eagerly awaited (*e.g.* Mithen 1995; Mithen ed. forthcoming). General models exist, arguing, for example, that the later mesolithic sees increased localisation of procurement in connection with changes in economic practice, regionalisation, or mobility (Myers 1987; Spikins 1996; Waddington 2000). The impression gained is often of opportunist, embedded procurement rather than a sense that these may have been structured routines. Gatherer-hunter mobility is frequently linked to the idea of direct procurement, and exchange in raw materials remains poorly understood (Hind 1998).

Even when discussed, procurement is often treated in a mechanistic fashion as a fairly transparent starting point for analyses of formal tool types. This is unfortunate for two reasons. Firstly, there are a number of hints of considerable complexity to stone tool procurement in the east; at Morton for example there are indications of quarried material (J Coles 1971) and analyses of shellfish suggest that their collection was subordinate to stone procurement. Deith argues that the importance of raw materials to mesolithic people's lives in Scotland greatly hinders our ability to use the dominant models of mesolithic mobility (Deith 1983; 1986). The analyses of Forvie (**6.4**) also demonstrate localised complexity to procurement. Secondly, by treating procurement in a mechanistic sense we deny ourselves the opportunity to analyse this in terms of social reproduction. Ethnographic studies have demonstrated that the procurement of raw materials is often caught up in complex systems of belief and plays an important role in social reproduction (Burton 1984; McBryde 1984; Paton 1994; Taçon 1991) and analyses of the neolithic of Europe demonstrate the potential of these approaches (Bradley & Edmonds 1993; Cooney 2000; Edmonds *et al.* 1992; Pétrequin *et al.* 1998). In eastern Scotland the nature of our data is such that many details will remain obscure, but procurement in the mesolithic can be understood in terms of social reproduction. I begin by discussing direct procurement in terms of the evidence for quarrying or removing material from primary geological deposits, before examining the utilisation of secondary material. I follow with a discussion of exchange.

7.3.1: Procurement from primary deposits

There are indications on many Tweed valley mesolithic sites of the use of quarried or primary chert, for example at Manor Bridge (**App. 2.3**) or Springwood Park (Wickham-Jones n.d. a). In the upper Tweed bands of outcropping chert are sometimes found at or near the tops of hills (Figure 155) and a number of quarry sites are known.

At present three chert quarries have been identified above the Tweed, mainly through the work of Bob Knox (Cowie *et al.* 1986; Knox *et al.* 1989; Knox & McKean 1993a), and recently, a smaller feature was identified in the Biggar Gap. Land-use on these hilltops is dominated by rough pasture and afforestation and many quarries have presumably been lost to the forestry plough. The quarries are ephemeral, and even had they survived forestry ploughing, would be almost impossible to identify in woodland. I have not undertaken systematic survey in order to identify further quarries, as at the onset of this research these quarries were so poorly known that it was not clear that they *were* quarries.[60] At this stage it therefore seemed more important to characterise those known. I have undertaken trial excavations of one site, and made EDM surveys of three.[61]

7.3.1.1: Flint Hill

The extraction pits at Flint Hill lie in rough pasture on a south-facing knoll rising steeply above the Hopehead Burn at *c.* 375m OD opposite Lateglacial chert-rich terraces (Figures 158-160). Approximately 500m upstream worked material has been identified near an eroding face of this terrace at Clashpock Rig (**App. 1.2.4**; Figures 156-7). The features on Flint Hill are ephemeral, and it is difficult to characterise their full extent, especially because of persistent heather and bracken cover. The main concentration is on the knoll top where 6-7 inter-cutting pits of 2-7m diameter and low banks of upcast can be discerned (Figure 161). The pits appear to have been cut directly down into the hilltop, rather than into the slope. Further small features are apparent in the area, but are hard to interpret and a larger platform/pit is slightly separated from the main concentration (Figure 162; see below for discussion). A few worked flakes are known from surface collection (**App. 1.2.11**). To the

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[60] It was suggested that they might be bomb craters from WWII training sorties.
[61] The fourth quarry (Burnetland Hill) was discovered late in the completion of this thesis.

west of the main concentration are three larger, irregular quarry pits, presumably associated with construction of the chert sheepfold 20m away!

7.3.1.2: Kilrubie Hill (Kilrubie)

The extraction pits at Kilrubie lie in rough pasture on gentle east-facing slopes at *c.* 370m some 2-300m from the rounded summit of Kilrubie Hill (404m OD; Figures 163-5). Bracken is dominant above the concentration, where some possible faint scooped features can be discerned. The main complex is difficult to interpret and is comprised of small and large scoops, humps and breaks of slope (Figures 166-7). There may be twenty scoops in total, varying in size and shape. Most are sub-circular, often broader than they are deep and less then 5m in maximum dimension, but some are as wide as 10m: few are deeper than 5m. Surface finds at Kilrubie include a few undiagnostic worked pieces (**App. 1.2.18**) as well as a large nodule of tabular chert recovered during survey. It is light blue-grey in colour with cream-brown interface deposits (Figure 168). This 'cortex' undulates gently and the nodule is from 10-12cm in depth. Other outcrops on site are not of quite this high quality (Figure 169).

7.3.1.3: Wide Hope Shank (Wide Hope)

The extraction pits at Wide Hope lie in rough pasture on a steep knoll at *c.* 425-50m OD on north and east facing slopes beneath the summit of Wide Hope (467m OD; Figures 170-172). The site is comprised of pits, scoops and hollows of differing sizes cut into the slopes of the hill and comparable to those at Kilrubie, and a further, smaller group of more amorphous features on the top of the hill, comparable to those at Flint Hill. Wide Hope is the most clearly defined of the quarry sites and on the slopes of the hill are 29 fairly well defined pits and scoops, ranging in diameter from 2-10m (Figure 173). Some features are complex and inter-cutting, and in places low banks of upcast material are present. The features on top of the hill appear to have been dug directly down towards chert and are quite different in character. A large surface collection of artefacts have been collected from erosive contexts on the hill top (Figure 174; **App. 1.2.38**)

7.3.1.4: Burnetland Hill

Features recorded by the Biggar Museum Trust on Burnetland Hill lie on southwest facing slopes above the Biggar water at *c.* 270m OD. Three large platform settlements, some 20m across and 5-10m deep, lie immediately downslope of a complex of 5 inter-cutting small pits, the largest of which is *c.* 10 m across and 4 of which are 3-4m deep.

7.3.1.5: Excavations at Wide Hope

Surface collections from Wide Hope (**App. 1.2.38**) seemed to imply that these features were of prehistoric date, but in order to establish this unequivocally a trial excavation was undertaken, aiming to clearly establish the character of the features, and obtain a sample of material for analysis. The full results of this excavation (which recovered over 100kg of material!) are presented in **App 2.6** (Figures 175-196). Here I offer a brief résumé.

The pit excavated (Figure 175) was a mass of shattered chert, with peat forming on top of working floors (Figures 176-182). The fill varied horizontally and vertically, and some was clearly derived from up-slope, possibly in conjunction with an intrusive clay-silt deposit (Figure 176, C.005). The pit developed from quarrying at the rockface, presumably removing crude or frost-fractured chert to retrieve higher quality material (Figures 183-5). In the small sample excavated a clear band of outcropping high quality chert was not observed, but *in situ* lower quality material was. Several fragmentary hammerstones were found (Figure 186), and direct percussion may have been significant. There are possible indications of burning in the samples of lithics, but no charcoal was found, and it is difficult to establish the role of fire in the extraction process.

The pit includes a wide range of chert, from high quality blue-grey through to creams, greys and rust-purples. There is a great deal of low quality chert, presumably badly affected by frost and/or exposure. Some debris is clearly worked, some possibly worked and some appears to be natural – although categorising many pieces is difficult. Cortex is quite common, and many pieces show characteristic cortex at each end of the artefact,[62] resulting from the exploitation of bands of chert that appear to have been *c.* 5cm thick. Bashed lumps and irregular cores are important (Figure 189), and a few blade cores were found (Figure 185, although blades are rare in the assemblage. Blade cores have also recovered from surface assemblages at Hope Burn on a chert outcrop (**App 1.2.15**). Spatial analyses indicate that some preliminary testing of material took place within the quarry pits themselves, but there is obviously a complex palimpsest of features in the area (Figures 192-196). No unequivocally retouched artefacts were found.

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[62] See Berridge (1994), Hind (2000) for discussion of characteristic 'winged flakes' of Carboniferous chert.

7.3.1.6: Dates and associations

The various quarries have many features in common, as well as slight differences. All of the complexes are small-scale and Flint Hill and Burnetland are notably smaller than Kilrubie or Wide Hope. The quarries either appear to have been scooped into the hillside, perhaps following an outcrop of chert, or in some places they have been cut straight into the hill top. Many pits are slightly wider than they are deep, possibly resulting from following an outcropping band. The date of the quarries is difficult to establish. No strictly diagnostic retouched pieces were discovered in the excavation or in the random samples collected from the surface. We should not anticipate that a quarry pit would be the most likely location for the deposition of functional tool types (although post-depositional movement of material has clearly been significant) and further excavations in the area surrounding the quarry pits might reveal associated activity.

There is an apparent association between quarries and platform settlements. At Burnetland this is very clear, whilst at Flint Hill a complex of platforms lies *c.* 150m above the quarry. At the medium scale of a few kilometres, Kilrubie is set within an extensive later prehistoric landscape, and Wide Hope sits above one. On Wide Hope and Flint Hill, a small platform feature, slightly differentiated from the other scoops, accompanies the quarries: the example at Flint Hill is some 5m in diameter (Figure 162), that at Wide Hope, *c.* 8m. These features are difficult to interpret from surface remains alone, but would be rather small for platform settlements, which often range from 25-80ft (7.6-24.3m) in diameter with most *c.* 40-50ft (12.2-15.2m) (Feachem 1961).

It is difficult to assess the importance of palimpsest in these associations, especially because the upland location of these quarries is a good environment for the observation of upstanding archaeological features but is not suitable for the discovery of lithic scatters and consequently the distribution of archaeological material is biased. In any case, the argument that chert quarrying is later bronze age is difficult to sustain. The unenclosed platform settlement at Green Knowe (Jobey 1980) included a few pieces of chert: a broken scraper, flake and three possible cores from Platform 2 (*c.* 3000 BP), a flake and rolled fragment on Platform 5 (*c.* 3200 BP) and no lithics were found at Platform 8 (*c.* 2800 BP) or 4 (Feachem 1961). Green Knowe lies *c.* 1.5km from the main band of chert, and *c.* 3km away from the quarries at Wide Hope or Kilrubie and the rivers and terraces of the area contain chert pebbles but the site contains little or no evidence for the intensive exploitation of chert, and certainly nothing indicating any need for quarrying for good quality material. Even if Green Knowe is not typical of platform settlements in its use of chert, bronze age industries are unlikely to have utilised a blade technology, which would suggest a mesolithic or early neolithic date.

There is evidence for extensive early prehistoric activity near the quarries. Within 0.5km of the quarry at Flint Hill blade core industries have been found in erosive contexts at Stobo Hope Head (**App 1.2.35**) and Clashpock Rig, whilst a microlithic site lies 3km downstream of Kilrubie at Shiplaw (**App 2.5**, Figures 58-66). On the Isle of Rum preliminary testing of bloodstone took place 12km away from the sheltered bay of Kinloch were final production took place (Wickham-Jones 1990). Using this arbitrary distance (an easy few hours walk) from procurement site to settlement, all of the chert quarries fall into extensive landscapes of early prehistory. Mesolithic activity in the area is extensive, and these industries are very reliant on chert and some of this material has been quarried (see above). Early neolithic settlement is also known in the area and although it is not as common as mesolithic activity the frequent deposition of early neolithic material in pits may be significant in masking the surface appearance of these artefacts (Healey 1987). Quarrying is well attested in the early neolithic of Britain, and is often associated with this period. However we must differentiate between the large-scale activity associated with long distance exchange, such as Langdale, Cumbria or Tievebulliagh, Northern Ireland (Bradley & Edmonds 1993; Cooney 2000) and the sorts of small-scale activity evidenced on the chert sources.

Finding parallels for these chert quarries is difficult: they are, as far as I am aware, unique in the British Isles. Chert use is widespread in the mesolithic of northern England and Wales but there is little direct evidence for quarrying. However rock shelters with mesolithic finds lie very close to Derbyshire chert outcrops (Hind 1998, 2000), and in the Vale of Clwyd the assertion that chert is 'perhaps unlikely to be quarried but was probably collected from the screes slopes' (Berridge 1994: 95) may reveal powerful *expectations* of mesolithic agency. In any case, these Carboniferous cherts both outcrop as bands in limestones, often in gorges. Extraction of chert in the Southern Uplands offers a rather different series of technological challenges.

At this stage it is therefore not possible to categorically establish the time period in which these quarries were in use. Other scatters indicate that primary material was significant during the mesolithic in the region, but our understanding of early neolithic industries is too limited to enable this kind of assessment. In any case, some areas see little change in procurement over the mesolithic-neolithic 'transition' (*e.g.* Hind 2000). I feel it is likely that the quarries were in use in part of the later mesolithic, and possibly the early neolithic. It is, however, the first of these time periods that I will focus upon in discussing the context of their exploitation.

7.3.1.7: Contexts

The inclination is to think of these hilltop quarries as beyond the routine landscape of prehistoric settlement, but none are more than 2-3 hours walk away from the main river system. In any case, the distribution of mesolithic finds in the Tweed Valley is testimony to extensive utilisation of the landscape as a whole: activity was not restricted to the riversides (**4.3**). There is blade working activity in the vicinity of the quarries, presumably associated in a broad sense with their use, and this is difficult to interpret in terms of visits to quarries organised exclusively around raw material extraction. Other tasks, possibly some hunting for example, may have been subordinate to the gathering of raw material. At Coulter, on the Clyde, (NT0332) Gleeson (1998) argues that settlement was connected to exploitation of the local chert sources, but due to the low quality of the material, was not solely a procurement visit but scheduled with other activities. In the upper Tweed although other tasks may have taken place near quarries it seems likely that the sources were a profound influence on some routines of movement in these upland areas. In this context the small platform features at Wide Hope and Flint Hill are of real interest and it is possible that they may be structures associated with the quarries. Excavation is a priority, but it might (speculatively!) be observed that most known mesolithic structures in Scotland are 3-5m in diameter and would fit very nicely into these low scoops.

It is difficult to interpret the longevity of use of these quarries. They are small, and it seems intuitively unlikely that they can have been intensively exploited over a long period of time. However, the indications from excavation are of some complexity, with redeposition of material. Nor is it possible to interpret the duration of any single visit to the quarries: are the small scatters nearby the product of a few hours rest, with crafting alleviating the boredom of waiting to meet friends? Or a few nights stop? Or coincidental palimpsest? Scatters in the area have come from erosive contexts, and it is therefore difficult to assess their real size. The intuitive assumption is that visits were short, although variation would have been significant.

Ethnographic studies suggest that quarries are often powerful, dangerous locations associated with a variety of forces and prohibitions, and may be connected with smaller groups within society as a whole (Burton 1984; McBryde 1984; Paton 1994; Taçon 1991). It is difficult to assess these concerns in this context, especially as many studies have focused on stone-axe production, part of larger exchange networks.[63] The extraction of chert was smaller scale, and there is little evidence of exchange. Despite this it is likely that chert was a symbolically laden

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[63] And because of the frequent association with axes with masculinity, a further assumption develops that quarries are male locations.

resource, as well as a practical one, and it is likely that through these associations quarrying activities were also symbolically laden even if the details of these phenomena remain obscure. This is possibly reinforced by the small scale of this activity – quarrying was *not* an everyday event, but something rather different – and although quarrying did not take place in isolation it may not have been undertaken by large groups. Of course, we can only speculate on the size or composition of particular groups – perhaps only women were involved, perhaps only certain age sets, perhaps a family operated one particular site over a few generations – but such categories are likely to have been fluid over time. Rather than deal with the details we should perhaps consider the knowledge about the world generated in these places: the histories, mythological and personal, that were entwined during these episodes of crafting.

Knowledge of the locations of chert outcrops was possibly originally obtained by tracing material in riverbeds upstream to their sources (Pétrequin *et al.* 1998). The site at Flint Hill is ideal here because moving upstream, one might first have discovered the chert-rich terraces opposite the outcropping material. In terms of natural plant successions all of the sites are likely to have been wooded in prehistory and it is important to retain a focus on the potential visibility of the sources at the time of their discovery. But for many, the quarries needed no discovery, only guided *re*discovery (**1.2.2**): they were part of the skilled, familiar landscape of myth and tradition. Presumably when in use these quarries were in light woodland, or a small clearing. Working stone here would probably have been laborious. Hard hammers appear to have been significant but varied antler, bone and wooden tools were probably used to heave and smash the rock. Some of these materials, such as the hammerstones, must have been brought from elsewhere, prepared for the task ahead. Quarrying was stone-craft on a different scale than the routine of blade core preparation. There were particular skills of quarrying, of knowing how to strike the material to remove the high quality chert, of identifying bedding and fault planes and working with them. At present these skills and routines remain obscure, but their learning and transmission would have been important. Quarrying was also dangerous work, not in the sense of falling from high cliff faces, but in terms of crushing fingers and toes. Scars would carry stories, and flat knuckles might tell of many visits to these places.

7.3.1.8: Discussion

A series of small chert quarries on the hilltops in the upper Tweed are associated with blade production. Given the use of quarried material in mesolithic scatters in the region it is likely that these quarries were in use in the mesolithic. The quarries are likely to have had considerable influence both on the character of movement and the processes of social reproduction. Many factors remain obscure but even in this poorly understood state the quarries add considerable complexity to our understandings of mesolithic stone tool procurement.

7.3.2: Procurement from secondary deposits

Pebble sources of chalcedony, chert and flint are significant in mesolithic industries in the Tweed Valley. In this section I review the procurement of chert and chalcedony, before discussing flint in relation to exchange, as pebble deposits of flint are very rare inland. Pebble deposits are found in contemporary riverbeds, relict river terraces and varied glacio-fluvial features. The distribution of material is not uniform through the river valleys, but concentrated in particular locations, unfortunately our understandings of the distribution of secondary material is limited.

7.3.2.1: Chalcedony

In archaeological contexts chalcedony is found in greatest quantity in the east of the study area, at sites like Kalemouth and Springwood – at the former it may represent *c.* 35% of all raw materials (Figure 210). A small amount is found at Dryburgh and Rink but higher in the Tweed very little is known. This may imply that the varied rivers draining the Cheviot were carrying the pebbles, and that small amounts appear to have been carried around the middle Tweed. However, there is some complexity to the utilisation of chalcedony. At Rink for example there is a small concentration of distinctive darker brown mottled material, approaching flint but clearly forming a continuum with the chalcedony. The distinctiveness of the material is indicated by its use; it is for example much heavier and larger than other chalcedony cores (**7.4.2.1**). This brown material is rare or absent on other chalcedony sites in the region. This evidence is hard to interpret; there are problems with samples, with establishing comparisons between sites, and also with limited geological background on chalcedony. However, this pattern seems unlikely to have arisen solely by chance collection. Further complication is indicated by the treatment of chalcedony during production (**7.4**).

7.3.2.2: Chert

In a number of assemblages the utilisation of secondary chert pebbles is clearly apparent. At Cavalry Park, Peebles (**App 1.2.4**, Figures 197-201; Knox 1994) for example a chert-dominated assemblage includes many bashed lumps, irregular blade cores and large flakes from the exterior of water rolled pebbles. It appears that preliminary testing was taking place on the site and cores and bashed lumps form a continuum, there is, for example little differentiation in size although formal cores are slightly smaller than bashed lumps (Figure 201). A few retouched artefacts including microliths, a microburin and scrapers suggest that Cavalry Park was not just an extraction site and differences in platform preparation and size demonstrate subtlety to manufacturing processes (Figure 200), although clearly the preparation and testing of (presumably local) material was important. Very similar preoccupations are evident in the assemblages from Kings Meadows (adjacent to Cavalry Park; **App 1.2.19**, Figures 202-204) and Ferniehaugh (a few hundred metres downstream; **App. 1.2.9**, Figures 205-206). The latter included a leaf-shaped arrowhead, unusual flint and pitchstone, and might be early neolithic in date. Problems of palimpsest aside, it is possible that this may indicate some continuity in the exploitation of a pebble source near modern Peebles. Pebble sources of chert are also important in the middle valley, forming part of assemblages from Rink and Dryburgh for example.

7.3.2.3: Discussion

Although it is hard to ascertain the details, some differences in the exploitation of 'pebble' material can be adduced, chalcedony for example does appear to be rather different than chert (see below). Some locations, such as those near Peebles, can be recognised to have been important resources for pebble chert, and this procurement seems to have taken place alongside other routines of activity. Further fieldwork is required to build up the body of comparative data necessary to interrogate these contexts in more detail, but procurement of pebbles was a complex social practice. Many questions do not allow of answers but offer reminders of the ways in which contextual experience may have helped to sustain particular forms of authority. Being able to spot and test pebbles discovered in these contexts was an important way of paying attention to the landscape. Fine distinctions between material may have been judged in a variety of ways, from sight to texture to sound. This was probably a fairly tacit skill but it was learnt by generation after generation.

7.3.3: Exchange

The use of non-local raw materials is a well-recognised aspect of prehistoric gatherer-hunter procurement, and can be testimony to extensive movement of material; for example chocolate flint from central Poland was found up to 750km from its source during the Allërod (Schild 1996). Mesolithic Tweed Valley assemblages often include materials that do not appear to have been derived from local sources and have been interpreted in terms of trade and exchange. The most notable is Arran pitchstone but some flint is also evidently non-local.

7.3.3.1: Flint

The presence of pebble flint in many Tweed Valley assemblages can be interpreted in terms of direct procurement from the beaches of eastern or western Scotland or occasional glacial deposits, or by reference to exchange. In the Tweed valley the distances involved are not great, from Peebles to the North Sea at Berwick is *c.* 80km whilst from Peebles to the Firth of Forth is *c.* 40km but 'common-sense' assumptions of local procurement are problematic. In the Millfield Basin for example there is no evidence for any use of coastal Northumberland flint, found only 15km away (Waddington 2000). Hind (1998) has strongly criticised the presumption that all gatherer-hunter raw material procurement is direct, demonstrating that the ranges raw material travels in northern England are greater than the annual ranges of any ethnographically known gatherer-hunters, and very much greater than any known forest dwelling groups.

Many commentators have argued that some kind of exchange is evident in the flint component of Tweed Valley assemblages. Mulholland (1970: 85) believed there was formal trade running through Lauderdale and over into Eskdale and the Solway.[64] She thought a 'highly translucent chocolate brown flint' in use at Airhouse Farm, Lauderdale (**App. 3.1.5**) was ultimately derived from northern England. This is difficult to interpret, as the non-local rich olive/brown/chocolate flint is most common in the later prehistoric arrowheads frequently found on site[65] and there is little clear evidence for the production of mesolithic artefacts in this material (Callander 1928; Clarke 1984). Mulholland's trade route runs through a number of sites with a high proportion of neolithic material and it is difficult to separate chronological from cultural factors in explaining the proportion of flint. She also argued that many 'peripheral' sites received little benefit from this flint trade. We have already noted (**2.1**) that these sites, for example those in the Yarrow, did utilise flint, although not as frequently as the local cherts. Waddington (2000) argues that the mesolithic inhabitants of the Millfield Basin were involved in a formal inland trade network for 'light grey' North Yorkshire' flint, citing Mulholland as support for this. Wickham-Jones (n.d. a) argues that Springwood Park, Kelso (**App 3.1.1**) includes local pebble flints as well as imported material, notably some chalky cortex black flint.

This range of data are rather difficult to interpret. Our understanding of flint diversity is limited: there is much variation in different assemblages, and at times it is difficult to differentiate between one or two exceptional pieces and a genuine alternative source.

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[64] Mullholland argues that links to the southwest are also adduced by the presence of pitchstone, but a more likely link for pitchstone exchange is through the Biggar Gap.

[65] Over 150 petit-trachet arrowheads and at least 40 other arrowheads (Callander 1928) normally dated by association to the later neolithic have been found on the site. The production evidence is troublesome, but might suggest that little production happened on site. Saville noted that these 'extraordinary' concentrations of fine artefacts suggest parallels with Irish arrowhead hoards (Saville 1994a: 66, note 6).

Changing patterns of North Sea circulation are likely to have led to changing patterns of raw material availability on the beaches whilst small amounts of flint caught up in the varied glacio-fluvial deposits of the middle Tweed may remain unknown to modern geology or were exhausted in prehistory. A detailed study of the flint available to, and utilised by prehistoric stone crafters in the Tweed is urgently required. Regardless of these difficulties however certain patterns can be adduced even if they are hard to interpret. At times chronological factors seem to have been significant, at Craigsford Mains for example, an assemblage with a strong early mesolithic and neolithic component is mainly reliant on the exploitation of large, non-local pebble sources not adduced at later mesolithic sites in the area. In the upper valleys chert dominates and there is clear evidence of careful curation of flint (**7.4**). Flint is more frequent in the middle valley, but this is an area with more evidence of later prehistoric settlement. It is my feeling that although some direct procurement took place small-scale exchange in flint was also significant during the later mesolithic of the Tweed but the relative importance of these phenomena at any particular stage of prehistory are impossible to gauge.

7.3.3.2: Pitchstone

Pitchstone is a dark-olive/green-grey volcanic glass with a fine-grained crystalline structure that is found in dykes and sills of the British Tertiary Volcanic Province (c.60mya) (Figure 207). Geo-chemical analyses indicate that only pitchstones from Arran were exploited during prehistory (Thorpe & Thorpe 1984).[66] Pitchstone has a wide archaeological distribution across Scotland, Northern Ireland and northern England, including finds in the Tweed Valley (Figure 208). The distribution map offered by Thorpe and Thorpe (1984) is now outdated, finds have for example been made from Barnhouse, Orkney and from field systems under peat near Calanais (Warren 2000b), Despite this distribution little is known about the exchange of pitchstone.

Pitchstone has been linked with mesolithic activity in the Tweed (Mulholland 1970). This date is clear on Arran, where pitchstone often forms part of mesolithic assemblages, as for example at Auchareoch (Affleck *et al.* 1989) and in the Firth of Clyde (Morrison & Hughes 1989: 8). It seems likely that pitchstone formed a small part of many mesolithic assemblages in this area, probably in connection with a fairly mobile population. It is notable that this pitchstone is not always the very distinctive high quality material characteristic of the large-scale movement of the material (B Finlayson, pers. comm.). One piece at Prestwick was almost indistiguishable from chert (Warren forthcoming a). Away from the Firth of Clyde these associations are not clear. Pitchstone is often manufactured with a blade core technology, possibly because of the physical properties of the material, and therefore technological comparisons are of limited use. Formal retouched artefacts are also very rare and typological dating is also of little assistance. In many cases an early neolithic association seems likely. Pitchstone recently recovered from fieldwalking and excavations in Clydesdale is frequently associated with carinated pottery and fragments of Langdale tuff axes (Ward pers. comm). Pitchstone appears in chambered cairns from the Ord North in Sutherland to Cairnholy in Dumfries and Galloway (see Thorpe & Thorpe 1984) and in early neolithic pit deposits in the northeast such as Kintore (*e.g.* Alexander forthcoming). This interpretation fits well with our general models of the importance of raw material movement in the early neolithic. But pitchstone does turn up later: late neolithic contexts were noted above, and bronze age pitchstone is known (Thorpe & Thorpe 1984), we must beware any one single explanation pigeon-holing prehistoric pitchstone use, especially given its intrinsic attractiveness.

The material from the Tweed cannot easily be dated. The numbers of artefacts involved are low, almost always <10, and frequently only 1 or 2 artefacts from a site (Figure 208). Mulholland comments that over half of the pitchstone comes from Crumhaugh Hill, a site with a large neolithic component (1970:86-7). The associations of other collections vary, but with problematic assemblages it would be easy to make too much of the data. Sites dominated by mesolithic artefacts do include pitchstone, but it is difficult to assess mixing. Rink, for example, includes at least seven pieces of pitchstone: a flake (Thorpe & Thorpe 1984), three blades and an unusual 'scraper' (Elliot collections) (Figure 209). Later mesolithic types dominate the assemblage and it has been argued that technologically there is little evidence for later activity (Haley 1990). However the assemblage also includes a range of distinctive serrated blades, often argued to be early neolithic in date (Edmonds 1995: 37, 40-41; also Wickham-Jones forthcoming b) as well as an occasional later prehistoric arrowheads such as the tanged example found during my excavations. It is impossible to pick apart these factors: are the serrated blades early neolithic in this context? Is the pitchstone later mesolithic or early neolithic? Similar problems exist with two pieces of pitchstone in redeposited assemblages from Springwood (Wickham-Jones n.d. a) given the presence of neolithic artefacts in surface collections (Mulholland 1970). Pitchstone also appears on sites that have no record of microlithic finds. This is difficult to interpret, as it is impossible to sustain an argument that mesolithic activity is absent from areas with no known mesolithic artefacts. It is, however, notable that on sites that can confidently be attributed to the mesolithic period

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[66] The Corriegills source on the Western coast was especially significant, and analyses have now identified individual outcrops exploited for particular assemblages (Meighan pers comm).

(*e.g.* those in the upper Tweed) pitchstone is entirely lacking. Although these are small sites, and not directly comparable to the complex assemblages of the middle Tweed, they are on a natural communication route through to the Clyde. The existence of large-scale pitchstone exchange in the mesolithic is also perhaps unlikely given the material's absence from assemblages in Aberdeenshire. This may imply that a mesolithic date for the bulk of the pitchstone in the Tweed is unlikely. However, I find it hard to believe that *none* of the pitchstone found in the Tweed is mesolithic in date, although it is impossible to quantify this or identify clear mesolithic patterns of activity.

The context of pitchstone use is also obscure. All of the material in the Tweed is small, often <40mm and frequently <20mm long and it is rarely formally retouched. Although a 'nodule' is recorded from Ancrum (Thorpe and Thorpe 1984) we remain unsure about the character of pitchstone during its movement. A large assemblage of pitchstone, including knapping debris is known from Luce Bay, Dumfries and Galloway (B Finlayson, pers. comm.), but this is not paralleled elsewhere on the mainland. Flakes, blades, chips and occasional cores dominate the Tweed pitchstone (Figure 209), and although refitting studies are needed these assemblages imply that some reduction was taking place on site. Primary or secondary flakes are rare, and the use of some pre-prepared or tested cores might be implied. Microwear analyses are needed, but it is hard to interpret pitchstone in terms of use – not least because it forms such a small part of assemblages. Indeed, although pitchstone's physical characteristics are poorly understood, it does not appear to be as robust as either flint or chert but it is a little sharper. Perhaps aesthetic properties were significant, and it is possible that pitchstone had important symbolic qualities. In any case pitchstone use in the early neolithic appears to have been relatively structured: it forms part of pit deposits, and turns up in funerary contexts. At Biggar Common, for example, a very large pitchstone flake was interpreted as fulfilling a ceremonial rather than practical function (Finlayson 1997: 228). In this sense the recovery of a small core and irregular flake at Sherriffmuir, in association with a standing stone complex and a mortuary structure (NMRS: NT24SW 1, 74) is interesting.

These factors relate to early neolithic uses of pitchstone and assessing the character of mesolithic use is very difficult. I argued that some of the Tweed pitchstone might be mesolithic in date, but that it is impossible to identify any particular pieces. It is therefore impossible to make detailed comments about pitchstone in the Tweed during the mesolithic. It is certainly possible that small amounts of pitchstone were making hand-to-hand journeys from the southwest. Possibly this was exchanged during the making and breaking of other alliances: a nodule exchanged as thanks for a meal, for example. In this context the distinctive aesthetics of pitchstone may have been important: on returning home a story could easily be spun about this strange stone acquired in the hills. The details remain obscure and it is clear that the extent of mesolithic use of pitchstone does not match that of the neolithic period. But at a much smaller scale, and in a less regulated fashion, the odd bit of shiny black volcanic glass may have played its part in establishing and maintaining relationships between people.

7.3.3.3: Discussion

Although problems surround both data sets the general indications here are that exchange, if existing, was small-scale. Some non-local material is present in many assemblages, and there are traces in the production evidence of differential treatment of varied rock types, but this cannot be related to large-scale exchange. Small amounts of pitchstone may have moved *c.* 125-200km from Arran but this is not comparable to the extent of pitchstone exchange in the neolithic and, even if *all* of the flint in the upper Tweed is derived from exchange (which is very doubtful), this is a small proportion in comparison with the exchange of chert in northern England (Hind 1998, 2000). Non-local raw material was an important aspect of procurement, but part of a system involving a variety of techniques. At this stage it is impossible to understand the mechanisms, or reasons for exchange but we might note that pitchstone and flint appear to have been treated rather differently. Flint, although valued, was part of the mundane toolkit whereas pitchstone clearly was not; if only by virtue of its rarity. Both may have held symbolic associations but these were manifested in very different ways. The organisation of trade and exchange is likely to have taken place on a small-scale, probably at a face-to-face level. The study of Forvie (**6.4**) demonstrated that subtle differences in raw materials exist between similar scatters, suggesting management of relationships and exchange at this intimate level. The use of a few distinctive pieces of flint, or perhaps the ability to be a little profligate with it, may therefore have served as a quiet symbol of links and alliances to other places, and managing these longer distance relationships, with kin or acquaintances, may have been important. It is possible that exchange sometimes involved trips away from the community, or sometimes took place in conjunction with a meeting of a larger community. The vast range of materials at Dryburgh or Springwood for example (**App. 3**) might have resulted from local gatherings at these spots, perhaps at times when the fish were running. Small exchange of material between those who had spent the summer on the coast, and those who had spent it inland, might take place – possibly sealing new alliances, or repaying old debts. The details, of course, remain obscure, but small amounts of exchange played an important part in the procurement of raw materials in the Tweed Valley and the rest of the east. The extent of this exchange is minimal in comparison to that of the neolithic, but that does not mean it was not important in historical terms, or in terms of the ways in which people came to know the world.

7.3.4: Discussion

The three discussions presented have much in common. In each case the data does not allow a tight resolution to the questions I am asking, but at the same time indications of patterns are apparent. Procurement of raw materials for stone tool manufacture was complex and subject to subtle conventions carried on in turn through the manufacture of objects from these materials. It is very likely, although it cannot be established for certain at this stage, that chert quarrying took place in the hills of the upper Tweed; some of this material may later have been exchanged. Chert pebbles were also collected from terrace sides and riverbeds and on some sites. Good locations for stone procurement may have placed particular emphases on the movement of people in the landscape: indeed good sources may have had restrictions on access based on ownership, myth and legend. Other materials were also significant. Chalcedony for example, appears to have been another pebble resource, but does not allow of easy interpretation and small quantities may have been exchanged. Flint was almost certainly exchanged in small quantities, and face-to-face negotiations may have played an important part in these deals. Pitchstone was rare, but possibly not unknown. Woven through these varied strands of procurement were different possibilities for human action: procurement was not a simple blanket process, the same for all concerned and neutral, but a total social phenomenon allowing people to further particular projects. That our archaeological correlates of these complex processes do not fall into easy categories may imply that they did not fall neatly into those categories in the mesolithic either.

7.4: Production

The analysis of the production of stone tools from varying raw materials in the Tweed Valley during the mesolithic offers further insights into traditions of behaviour and contexts of action. Although a wide range of information on raw material use is available for the various Tweed valley industries serious difficulties exist in standardising samples. In part this reflects the history of research, and for many early collections there can be little reliance placed upon absolute figures even where reasonable controls can be identified for the collector in question. At times, difficulty with samples obscures the potential meaning of many patterns, but without some attempt to analyse the large scatters characteristic of some Tweed Valley sites, such as Dryburgh, it would be impossible to make any meaningful statements about the character of settlement in the region. Fieldwork to assess scatters also suffers from the unquantifiable bias of many years of collection: it is, for example, unclear how representative the remaining material at Rink is. Further difficulties arise in literature reviews, as archaeologist's descriptions of raw materials vary greatly. Notwithstanding these difficulties broad-scale patterns can be identified in raw material use in different areas, and the detailed implications of this traced on some particular sites.

7.4.1: Overall raw material use

The sites with most control on overall raw material use (Figure 210) are those in the upper Tweed excavated as part of this research, or collected by Knox. At Manor Bridge chert comprises 85.9% of the assemblage with flint making up most of the rest of the material (12.8%) (for detailed comment on Manor Bridge see **App. 2.3**; Figures 211-250). The Dookits is very similar (despite differences between formal types in the scatters) with a little more flint (**App. 2.1**; Figures 251-261). Surface scatters with mesolithic artefacts from Neidpath Haugh (**App. 1.2.27**) and Plantation (**App 1.2.24**; Figures 262-263) – the latter may be continuous with Manor Bridge – are very similar (for location see Figure 24). The two small sites of Edston 2 (**App. 2.2**; Figures 264-270) and Shiplaw have even more chert whilst Cavalry Park, arguably a location where the exploitation of riverine pebbles took place, also has almost exclusively chert. Higher in the hills near the chert outcrops and quarry sites no materials other than chert feature in known assemblages, although the date of blade scatters such as Stobo Hope or Clashpock is not well known.

Downstream the samples are more complicated but some general patterns emerge. At Rink Farm Halley (1990) argues that 72% of the assemblage is chert, 13% flint and 8% 'agate' (referring to chalcedony). This assessment is based on the complete artefacts and more regular pieces, and may under-represent the overall quantity of chert. A random sample of redeposited material from my excavations at Rink had 80.1% chert, 15.8% flint with the remainder chalcedony. Assessing the composition of scatters from Dryburgh Mains is even harder, Barrowman retrieved 85.5% chert from recent surface collections (C Barrowman, pers. comm.) although the loss of flint over time is impossible to quantify. Both sites, although still dominated by chert, have increased proportions of other materials, especially chalcedony, which is very rare higher up the river. Few other good samples exist from sites in this region. The Munro collection from Fens is likely to be incomplete, as blades are very rare, but chert is the most significant material. Craigsford Mains is dominated by flint, but this is arguably of different date, and flint dominated collections from Airhouse have already been discussed (**7.3.3.1**).

A different picture again emerges from Springwood Park and Kalemouth. Elliot's collections from Springwood (Wadia 2000) are biased but Wickham-Jones' analyses of redeposited material (n.d. a) have chalcedony as the dominant raw material with chert, and small amounts of flint also important. A similar pattern can be seen at Kalemouth (Figures 271-274), where, although there are difficulties in understanding the Forsyth collections, chalcedony and flint are important. Elliot's collections from Kalemouth include much more chert. This region has natural supplies of chalcedony, and it is unsurprising that it is a feature of the industries. However, chert and chalcedony do not appear to be equivalents even if the proportion of flint identified by Wickham-Jones at Springwood is similar to that from the chert rich sites.

A number of patterns can be identified in the use of the differing raw materials. At Manor Bridge and the Dookits for example irregular flakes and chunks are more frequent in chert than they are in flint. This pattern is also apparent in the sample of material from the Rink excavations. Whilst it may partly arise from differences in fracture properties of the raw materials, with flint breaking in more regular and controlled fashions, it is also likely that these differences indicate differences in the production processes involving these raw materials (see below). Differences can be traced by examining cores, blades and retouched pieces.

7.4.2: Cores and core technology

The evidence from cores of differing materials allows us to examine, in a fairly crude way, structures of working in prehistory. For the purposes of these preliminary analyses cores have been categorised according to size, number of platforms and some simple morphological features. The patterns identified might be examined further by more detailed approaches to core technology (*i.e.* Finlayson, Finlay & Mithen 1996) but at this stage, such a detailed approach was not appropriate.

7.4.2.1: The upper Tweed

In the chert-dominated industries of the upper Tweed most cores are chert and the rare flint cores are very small or unusual (Figure 275). At Manor Bridge for example 57 (91.9%) of all cores were chert (a higher proportion than the assemblage as a whole) and only 4 (6.5%) flint . Cores made up 8% of the chert in the assemblage (10% including bashed lumps), and only 3.8% of the flint. Of the four flint cores only one was intact as opposed to 75.4% of all chert cores. These facts may indicate some kind of distinction, possibly best understood as curation of flint in comparison to the more abundant chert. This is also seen at the Dookits and Shiplaw: at the former site only six cores were found, of which one is flint, worked to exhaustion. Ten cores were recovered from Shiplaw. The only flint example is manufactured on a very small pebble (22 x 27 x 22mm); it has an unusual platform created by small flake blows and a series of small blade removals, demonstrating a remarkable structuring of flint use.

Chert cores are harder to understand. They are often small (Figure 276). Those at Cavalry Park and Shiplaw are a little larger than Manor Bridge, but this may be due to the tasks undertaken on site; Cavalry Park for example may have been a procurement site. At Manor Bridge and Cavalry Park samples of chert cores and bashed lumps allow some comparisons between these types. At neither site is there a categorical distinction in size between the artefact types (Figures 237 & 201), suggesting that many smaller pebbles or nodules were being tested and worked and that the small size of formal cores is not indicative of their being worked to exhaustion, but of the initial size of material available. Even cores from Wide Hope are still small. At Manor Bridge some selection in raw material can be observed. Although the distinction is not absolute the more formal chert cores tend to be of higher quality chert than the majority of the assemblage; grey-blue in colour with patches of fresher 'cortex' possibly indicating the use a primary deposit. Both single and double platform cores were known, and many have irregular, less structured removals. There is quite a range of core types: single platform cores are often cylindrical rather than pyramidal, but removals rarely extend around the whole of the platform. Two-platform cores are often opposed, sometimes on the same face, sometimes on the opposite face. The sample of cores from Cavalry Park is smaller but also demonstrates a range of differing types. Similar patterns are also apparent at Shiplaw where a range of larger cores may indicate the exploitation of local sources but one high quality chert chunk has two opposed blade platforms on one face which is no more than 17mm in length. This seems to indicate that good quality chert might also be valued.

In the upper Tweed flint cores appear to have been highly valued; they are rarely deposited and often very small (although the sample does not allow a meaningful quantification of this). Those that are known are seemingly worked to exhaustion or broken. Chert cores are harder to interpret, not least because the distinctions between good and poorer quality chert are hard to quantify. Chert cores in this area are very varied but subtle distinctions in the use of varied quality chert can be observed.

7.4.2.2: The middle valley

At Dryburgh chert forms 64%, flint 20% and chalcedony 13% of a sample of 394 platform cores in Munro's collection. This lower percentage of chert than in Barrowman's sample, might reflect collection bias (a small sample of cores from Munro's collection from Fens has similar percentages). The loss of part of the Rink assemblage makes absolute comparisons difficult. Haley (1990) argues that 83% of the cores in Elliot's collections from Rink are chert, however my re-sampling of this material, in line with categorisations used on other sites, gives similar proportions of raw material with other sites (Figures 275 & 276). Regardless of the particular problems of these collections it appears that flint cores are more frequent in this area than they are in the upper valley and that chalcedony cores are also a small part of industries. Examining these sites in more detail reveals complex, overlapping patterns.

A few bipolar cores are included in the Dryburgh material and although it is difficult to assess the statistical significance of this core type over the assemblage as a whole it is notable that these were very common in flint. One of every nine flint cores examined was bipolar, as opposed to one in every fifty chert or chalcedony cores (Figure 277). Bashed lumps, although not analysed quantitatively, were dominated by chert. A sample of 50 chert, 25 flint and 25 chalcedony cores were analysed in greater detail.[67] Looking at overall averages[68] chert cores are 35% heavier than flint cores and 42% heavier than chalcedony cores (Figure 277). However, this minimises the real extent of the difference, as the *complete* examples from the samples show chert cores to weigh 43.4% more than flint cores and 65% more than chalcedony cores (Figure 278). The distribution of weight of cores is also interesting (Figure

[67] These samples were selected by making grab samples whilst ensuring that all sizes were represented. As the Munro collection has been sorted and a selection of the more formal pieces labelled individually, samples were made from both bags. 25 from each for chert, 10 labelled 15 unlabelled for flint and 7 labelled and 18 unlabelled for chalcedony.

279). Chert cores are often heavier than other raw materials and range in size widely; small cores are still important. Chalcedony cores are always small, over half weigh less than 5g and 80% less than 10g. However, there are few very small flint cores, less than a quarter weigh less than 5g although 68% weigh less than 10g. It is possible that this arises from the use of exhausted flint for bipolar cores, which average 4g in weight in flint (Figure 277). There are also subtle differences between the raw materials in terms of numbers of platforms and core morphology (Figures 280-281). Chalcedony cores most frequently have only one platform and are often cylindrical/pyramidal types. Two-platform cores are more varied; including opposed, perpendicular and irregular types and often weigh more than the single platform examples. Flint cores also frequently only have one platform, but some have two or three, and they vary more in type than chalcedony. There is little distinction in weight by number of platforms. Simple unifacial one-platform cores are the most significant type although cylindrical/pyramidal one-platform cores are also common. Multi-platform cores are very varied. Chert cores, on the other hand, may have one or two platforms and are very morphologically varied. One-platform cores are often rather irregular, featuring unifacial removals across one face of a chunky or squarish chert nodule. Smaller cylindrical/pyramidal examples are present in the higher quality materials. Two-platform cores are often opposed, if not necessarily on the same face and are often lighter than single platform types.

At Rink, bipolar cores are also more common on flint (1 in 8 of all flint cores studied) than chert (1 in 26) (Figure 282) although more bipolar and irregular cores may form part of the large missing part of the collection. Chert cores are the heaviest types present apart from the distinctive dark brown ?chalcedony (**7.3.2**). They weigh on average 49.4% more than flint cores and 27.6% more than chalcedony cores, range the most in weight, and their inter-quartile range almost entirely separates them from the flint cores present. The ?chalcedony is very distinct. Looking in detail at the core sizes further patterns emerge (Figures 283-284); 75% of flint cores weigh less than 10g and 69% of the chalcedony. Cores of less than 5g are rarer here than at Dryburgh, this may reflect collection, or differences in the treatment of raw materials in the past. Morphology offers further indications of structures to prehistoric practice (Figures 285-286). Chalcedony cores frequently only have one platform, and cylindrical/pyramidal single platform examples are important, as are unifacial cores. Most second platforms are at ninety degrees to the first on the opposite face. Two-platform chalcedony cores are often larger than single platform chalcedony cores. ?Chalcedony cores are varied in type, but normally neat and always abandoned before exhaustion. Flint cores are likely to have one or two platforms. Single platform flint cores are often cylindrical/pyramidal

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[68] Including broken and complete examples.

although uniface pebbles are important. Two-platform cores are very varied and often weigh less than single platform cores. This probably reflects the value of this material, which is being worked to exhaustion. Chert cores are also varied, with single platforms more common than two platforms. Three-platform cores are present. Single platform chert cores are often removals across one face of a pebble, often maintaining a chunky/triangular section. Cylindrical/pyramidal types are also important on better quality material and weigh less than other chert cores. Multi-platform chert cores vary greatly in type, with removals opposed or at ninety degrees to the other platform, sometimes on the same face, sometimes on another one.

A small sample of 22 cores from the Munro collection from Fens has similar patterns. All of the cores from Fens are very small (Figure 276). The presence of so many small cores, as well as the unusual dominance of more formal chert cores suggests that the sample from Fens has been affected by a subtle collection bias although all blades from the site are also small. In any case, chert cores are the heaviest, weighing on average 100% more than flint cores on average and 34.5% more than chalcedony. Flint cores are often less than 5g whilst chert varies more in size. Core types also varied, chert examples are more likely to be single platform than double, and cylindrical/pyramidal types are important. Two-platform cores are more varied. Chalcedony cores vary widely in type, and often have more than one platform; the few flint cores are all small and worked to complete exhaustion.

Few details are available for core types in the chalcedony dominated regions to the east of the study area. Cores in chalcedony, chert and flint are known from Kalemouth, but given problems with samples it is difficult to assess the characteristics of this. Wadia (2000) discusses 5 cores from Kalemouth, 4 of flint and 1 chalcedony, average length 24mm. Wickham-Jones (n.d. a) gives few details on core types at Springwood, noting that many of the 96 cores are classic blade cores and that there is careful core rejuvenation evidence. Cores are worked until very small, abandoned with an average length of 23mm (the 8 cores examined by Wadia averaged 22mm in length). Bipolar cores are also present. Cores adequately represent the range of raw material utilised

7.4.2.3: Discussion

This range of data on core types and characteristics in different areas does allow some generalised statements despite some problems with comparability of different samples. In the Upper Tweed flint is rare; flint cores are often small, heavily reduced and are much less frequent than their chert counterparts. In the middle valley it is difficult to assess the relative proportions of material in absolute terms, but flint is more common than it appears to be upstream. Small sample sizes in the upper valley make quantified comparisons of flint sizes difficult but chert cores seem to get smaller down-river (Figure 276). Near Peebles many cores are *c.* 28mm in length, and on some sites this figure is higher. At Rink and Fens this is *c.* 24mm, whilst at Dryburgh it is 26mm. (Cores are also small at Springwood (*c.* 23mm) although this includes other raw materials). Chalcedony is only found in the middle valley. The small size of all cores is very interesting as it may imply the use of some kind of clamp, or distinctive bodily routines designed to secure cores of this size.

Chert is worked in a variety of ways, using single or multiple platforms. On all sites a variety of techniques are utilised but the most common is a single faced core, worked across a pebble. The lack of categorical distinction in the chert-rich areas between a bashed lump and an irregular core is clearly indicated by the size of these pieces. Some material was evidently derived from pebbles, but *in situ* deposits of chert were being used. Higher quality material, from either source, is sometimes used for pyramidal/cylindrical blade cores, and these can be very small. Two-platform cores are also irregular, and the impression gained is of a real interplay between the skills of the craftsperson and the rather recalcitrant material to hand.

Flint cores also vary in type. In the upper Tweed flint core types are often irregular, due to the exhaustion of these pieces. At Rink and Dryburgh very small flint cores are rare and there is some evidence to suggest that when exhausted these pieces were used as bipolar cores. At Dryburgh flint cores often have one platform, and unifacial examples, as well as formal cylinders are common. Multi-platform cores weigh about the same as the single platform types, and are worked in a great variety of fashions. At Rink slightly more flint cores are formal cylinders, and multi-platform cores appear to have aimed at the further reduction of the materials concerned. These factors suggest considerable complexity, but also that flint was valued in comparison to chert and chalcedony, possibly because of its physical characteristics.

Chalcedony is treated rather differently. At both Dryburgh and Rink single platform fairly formal pyramidal or cylindrical cores are the most significant type and can be very small, some are classic morphological examples developed on a split pebble. Two-platform chalcedony cores are often larger than single platform examples and vary in type. It is notable that the utilisation of a second platform is not an attempt to maximise returns from the material, as it may have been for flint, but might be understood in terms of maximising returns of a particular size. It may initially seem surprising that chalcedony appears to be worked in the most structured way, whereas flint is a little less regular but this is likely to be a product of the distinction between our forms of analysis and prehistoric activity. Chalcedony is worked in structured, formal ways that we can recognise, but so is flint, until the latter stages of flint working make the final core *less* morphologically regular.

There are a number of ways of interpreting this data. One factor is chronological. Although there are problems with the comparability of the samples many distinctions can be seen with the site of Craigsford Mains, arguably early mesolithic in date (**2.2.1.2**). Only 12 cores were available for analysis from Craigsford Mains, of which 10 are flint, averaging 9.9±3.1g in weight and very small flint cores are rare (Figures 287-8). However, the notable difference is the dominance of cores with two platforms, opposed on one face of a pebble, which make up 80% of the flint cores (Figure 289). Although present on other sites, this stress on this one approach is unusual and may have chronological significance.

At another level however, and notwithstanding some problems with samples, these patterns are likely to have derived from meaningful structures of prehistoric behaviour. Careful sets of value judgements must have been in play in the reduction of varied materials, and we can begin to move towards understanding some overall principles (the importance of flint, or tendency to work chalcedony in fairly formal ways for example) and understand variations from this. The material patterns are not consistent over all of the sites analysed, although at this stage this does not allow of interpretation.

7.4.3: Blank production

As well as the evidence from cores an examination of removals also highlights distinct patterns in the mesolithic use of raw materials in the Tweed. In some areas, such as the upper Tweed, these patterns are relatively distinct, whereas in the middle Tweed the situation is much more complicated and it is difficult to assess whether sampling difficulties have had a significant impact on the final patterns. On all sites platform sizes seem to indicate the use of either a punch or soft hammer percussion (*contra* Haley 1990) although difficulties with analysing bulb types on materials such as chert mean it is not possible to be completely confident about percussion types. Hard hammer percussion was certainly used and it may be that a flexible series of approaches were used for certain tasks, such as testing material or preliminary reduction. One notable aspect of the Tweed Valley chert industries is the comparative absence of 'winged' flakes characteristic of the use of banded outcrops of Carboniferous chert in Wales and northern England (Berridge 1994; Hind 2000). In part this may derive from the use of pebble sources, and the preparation of cores at procurement sites as well as geological differences between the chert exploited in the two areas.

7.4.3.1: The upper Tweed

At Manor Bridge flint is preferentially used for the production of both blades and regular flakes (Figure 238): for example 19.4% of all blades are flint as opposed to 12.8% of the assemblage as a whole. Flint blades are longer and more variable in size than chert blades, are often wider and also greatly exceed flint regular flakes in size (Figure 239). Flint regular flakes are comparable in size to chert regular flakes, which are very comparable in maximum size to chert blades. This implies that the distinction in size between flint and chert blades is not simply a product of the size of the raw material available, as if it were large flint flakes should also have been observed. The difference therefore seems likely to derive from technological choices. In part this may be related to the physical properties of the material, it has for example, been suggested that the longitudinal strength of flint is greater than that of SU-chert (Finlayson 1990) and it is possible that larger wider flint blades (Figure 240) may have been important for longitudinal actions.

Further distinctions between the materials are apparent. On both flint and chert, blades are more likely to receive simple or complex platform preparation than are regular flakes, which in turn receive more attention than irregular flakes (Figures 241-242). Flint also receives more preparation than chert, especially in terms of complex preparation. There are distinctions in platform size between the materials, although this is more notable on regular flakes than blades (Figure 243-245). Flint often has smaller platforms than chert, possibly indicating a greater amount of care and attention being paid to the material. Irregular flint flakes often have larger platforms whereas irregular chert flakes still have very small platforms. This may indicate the unpredictable fracture of chert, where almost regardless of the extent of platform preparation and care some flawed removals are inevitable. Very similar patterns can be seen in the chert evidence from Cavalry Park where the regular and irregular flakes with very small platforms may result from flawed blade production (Figure 200). At both sites the use of a different reduction technique for some irregular flakes may be indicated by larger platform sizes.

Similar structures to stone working can be seen at the Dookits where, despite a small sample, flint is also preferentially used for blades and regular flakes (Figure 256). Although the sample is small chert blades are comparable in width to those from Manor Bridge (Figure 257). Flint and chert were carefully worked, with small platforms and careful preparation, although this is not as extensive as at Manor Bridge (Figure 259). However, flint blades are not the widest removals, and chert flakes are a little larger than flint flakes (Figure 258). Perhaps these subtle differences demonstrate improvisations within structures of stone working that suggest a differentiation between classes of raw materials but do not dictate what these pieces will be used for.

7.4.3.2: The middle Tweed

In the middle valley a complex, and partly contradictory pattern emerges, which nevertheless indicates differences in the approaches taken to raw materials. Given sampling difficulties it is difficult to quantify overall proportions of material, but by analysing platform type and size it seems likely that I am analysing something which did not deliberately structure collecting activities and that the samples taken are therefore quite random.

1113 blades and 6433 flakes from Dryburgh form part of the Munro collection.[69] Flint forms 30% of all blades, chert 60.5% and chalcedony 9.5%. Chalcedony is more frequent amongst the flakes (13.9%) and these are *c.* 25% heavier on average than chert or flint (Figure 291). Flint is more frequently found amongst blades and flakes than among the cores from Dryburgh and this may suggest some preferential use of flint for blades (see also Wadia 2000) and some curation of flint cores. Sub-samples of blades were analysed in more detail.[70] Chert blades are frequently the smallest and narrowest examples, and flint often the largest and broadest, but there is no categorical distinction between the material types, chalcedony in particular varied in size (Figures 292-293). Chalcedony has slightly wider platforms than chert or flint, and flint the most consistently small (although the distinction from chert is minimal) (Figures 294-295). Simple platform preparation is common on all raw material types, although slightly less frequent on chert than the other materials. This does not fit into the same pattern as the upper valley: chert is treated much more formally at Dryburgh, although chert blades are still smaller than flint. It is notable that the average size of blades at Dryburgh is much higher than that upstream. This may be a product of collection.

The data from Rink is different again. A sample of 125 blades from Elliot's collections were analysed, of which 24.8% were chalcedony, 35.2% chert and 37.6% flint[71]. It seems very likely that flint and chalcedony are over-represented amongst blades as opposed to cores (Figure 282). Flint blades at Rink are smaller than other materials (Figure 296), especially the chalcedony, and this is in keeping with the small size of flint cores at Rink, and especially with the use of a second platform to further reduce flint cores. The blades are still larger on average than those from the upper valley. Platform sizes are consistently smaller on flint than the other raw materials (Figures 297-298), and a much higher proportion of platform

[69] NMAS: BMB655
[70] 10% of chert and flint, 20% of chalcedony as a 10% sample was less than 10 pieces.
[71] No blades of the distinctive ?chalcedony material were recovered

preparation is expended on flint that either chert or chalcedony (Figure 299). Indeed, chalcedony appears to receive less attention than chert. A similar differentiation between flint and chert blades is apparent in a very small sample from the Munro collection from Fens, where flint blades have smaller platforms than chert. Most blades here were small although the sample was too small to allow quantification.

As noted above there are serious difficulties with the representativeness of collections from Kalemouth but there are indications of raw material differentiation with flint in particular being treated rather differently (Figures 271-274). At Kale 1 chert receives less preparation than either chalcedony or flint. At Kale 2 flint receives more preparation than either. Platform sizes for all removals vary widely at Kalemouth, although they tend to be smaller in flint that other materials. Chalcedony flakes are larger, and vary in size the most whilst flint flakes are small. Flint blades on the whole are smaller than chalcedony, and chert blades very small. Interestingly, flint blades are bigger, on average, than flint flakes, whilst chert blades are smaller on average than chert flakes.

Finally a series of stark contrasts can be noted with the site at Craigsford Mains. Here a total of 103 blades were present in the Munro collections of which 100 were flint. Flint blades average 2.91g in weight (Figure 300), over two times as much at Dryburgh (1.17g). The blades are much longer and wider than any other site discussed although they are of comparable thickness. Even larger blades form part of the Oliver collection from the site (BMA1849-1850), the largest of which is 97mm long. Simple platform preparation dominates (Figures 301-2). The blades from Craigsfordmains are not comparable to the other sites discussed and this adds further support to the argument that the site is of a different date than the majority of Tweed Valley scatters.

7.4.3.3: Discussion

This range of data does not resolve itself into any simple patterns and difficulties with sample controls in some contexts complicate comparative assessments. But a series of distinctions in human practice in prehistory can be observed. This is clearest in the upper valley; here the production of flint flake and blades was a structured activity, with strong hints of the importance of flint as opposed to chert. On some sites it appears that this was because of the increased breadth of flint blades. Chert also received careful attention, but this was not always sufficient to stop irregular fractures. In the middle valley some sites, such as Rink, show the importance of flint, which receives more care or attention than chalcedony or chert. But other sites, such as Dryburgh, show fewer distinctions. Flint is sometimes the smallest type of removals, at other times the largest. In some places chalcedony is important, in others it is not. It would not be appropriate to make too much of this at the moment, complex structures of activity, and possibly change over time are likely to be significant. The local availability of raw material may also have had some significance: for example the local presence of chert at Rink. The size of removals is very interesting. Chert removals in the upper valley are very small, and those on the big sites of Rink and Dryburgh are larger, despite the small size of cores in this area. This seems likely to be a product of collection bias, although further sampling of these sites is a priority.

Finally it is important to note that some of the variation between material types may be physical. Chalcedony in particular has a notably different physical structure to either flint or chert and different routines of stone-craft may have been significant. Only experimental work will resolve many of these issues but it is important to note that the variations observed in practice so far, even if influenced by raw material properties, were also an important part of the structures within which people came to know and act in the world.

7.4.4: Retouched pieces

Flint is preferentially utilised for retouched pieces on almost all of the sites examined in the Tweed (Figure 303). At Rink for example 40.1% of all retouched pieces are flint as opposed to *c.* 20% of the assemblage. Although there are no categorical associations between raw material types and artefact types at Rink there are some general patterns. Flint is used for many different types of artefacts, but is important for convex scrapers, which are very rare in chert. Chalcedony is more likely to be made into scrapers than any other artefact type but is not as frequently retouched as the other materials. Chert is important for many geometric microliths whilst flint is especially significant for obliquely blunted points. A similar pattern is seen at Dryburgh (Figures 304-305), where in artefacts from the Munro collection chert is most significant for narrow blade microliths, and flint for broad blade. This probably reflects the physical properties of these materials as well as possible chronological differences. Microburins are rare in chert at Dryburgh where chalcedony is most likely to be made into scrapers (which are rarely of chert). Wadia (2000: 13) also argues that chalcedony was important for scrapers at Springwood although flint was the dominant retouched material. At Kalemouth chalcedony was used for microliths as well, although chert was often used for these artefacts on both sites. At both Kalemouth and Springwood flint is preferentially used for retouched artefacts in general.

Higher up in the valley, despite better samples it is difficult to interpret clear patterns because of small assemblage sizes and the absolute rarity of flint. At Manor Bridge a range of irregular scrapers on chert make absolute comparisons between artefact types difficult, flint is slightly over-represented amongst retouched pieces, but only by a little (Figure 247). At the Dookits this over-representation is clearer, flint forms a quarter of all retouched pieces as opposed to only 15.5% of the assemblage as a whole (Figure 260). One in five of the flints present on site was retouched. At Shiplaw and Edston 2 the samples are too small to allow any meaningful comparison between sites. At Cavalry Park flint is massively over-represented in a small sample of retouched pieces.

7.4.5: Review

This range of data suggests that the production of stone-tools in the Tweed Valley during the mesolithic was far from the execution of a template. Craft routines took place on a fine balance between a series of expectations and prejudices about how to work certain materials and the task being undertaken at the time. General themes were important, flint for example seems to have been especially significant on many sites, but these were creative structures, not prescriptive ones. Stone working skills were inculcated through agents biographies and might be manipulated in any given context, and these variations probably created some, at least of the fuzziness of our data. Deliberately working flint in a wasteful fashion for example, might be a way of proving a point to someone, or of releasing anger or tension at them. Of course, the details remain hidden, but the evidence is suggestive of some complexity, possibly of change over time. This certainly appears to be significant in comparing Craigsford Mains and the other Tweed Valley sites. It may also be significant in explaining the distinctions between Rink and Dryburgh, although many other explanations, from the availability of raw materials through to political relationships with other social groups in the area may have been significant.

To an extent these small details – changes in platform width and types of preparation – appear to be obsessive minutiae with no real significance to understanding prehistory. And yes, this is not the stuff of grand narratives, but that does not mean it was not important. It is possible, likely even, that many of the distinctions discussed above may have been unconscious or tacit, for example hitting chalcedony in different ways to flint because of its fracture properties. Other structures may have been more explicit, not to waste flint, or not to use chert for knives. These gentle rules and reminders, very much a part of everyday life, that formed a vital context for the extension of an individual's biography in the Tweed. They were a distinctive part of the historical experience of the mesolithic in this area. To take, for example, a mesolithic person from Forvie, let alone further afield, and place them into the Tweed Valley may have exposed them to a very distinctive series of expectations. Their ability to adapt to these new structures may have rapidly marked them out, or helped them to fit in. Often these levels of analysis have been absent from accounts of the mesolithic, but these kind of routines were vital to the creation, and maintenance of forms of knowledge in the past. The studies offered of production in the Tweed go some way to elucidating some of these routines and structures.

7.5: Deposition

The final opportunity to study the ways in which stone-craft contributed to the generation and maintenance of particular kinds of knowledge lies in examining the deposition of stone tools or debris. In this review I shift focus away from the Tweed Valley to consider the study area as a whole. It is surprising that the conditions under which mesolithic artefacts are deposited has seen relatively little critical attention, and our understanding of the significance of the spatial patterning of finds, at a variety of scales, is crude.

The end of the 'use-life' of a stone tool may be due to conscious decisions, casual losses, breakage, or anywhere between these extremes. In order to think our way through this range it is helpful to distinguish between two ways in which stone tools may have meaning: for the sake of my argument I propose that stone tools can hold *tacit* or more *explicit* associations (see Edmonds 1995, 1998). We will explore the possibilities of these frames in more detail, but it is important to note that tacit and explicit meanings are connected, in a similar fashion to the ways that daily life and ritual are connected. It is through the former that potentials for the latter are generated, the latter then feed into and inform the former.

Tacit meanings refer to low-key associations, probably intimately tied up with daily-life and the compulsion of subsistence: the ways that tools and stone-craft may have been associated with tasks. For example, bipolar knapping has been linked to the preparation of fish (Finlayson 1990), for which a supply of unmodified flakes is adequate. Individuals may have understood such associations in the past, and these may have carried further resonance. Perhaps children carried out the preparation of fish more frequently than adults – bipolar knapping could then have been associated with children's activities. The details remain obscure, but these quiet, repeated associations were an important aspect of socialisation. In contrast were times and places when stone tools were used to say something explicit about how people related to the world, for example when deliberate deposits are made with burials. In these episodes the associations that tools and stone craft carry were highlighted (Edmonds 1998). These were opportunities for agents to exploit the communicative potential of stone craft: when the deployment of stone tools might serve to reiterate or challenge common understandings. Tacit meanings may be difficult to spot archaeologically, as they are inherently understated. Explicit meanings may be easier to spot, or, at the very least, we may be able to identify some of the times and places when ritualisation crystallised the symbolism of stone.

The explicit symbolic use of stone tool deposition appears, at first glance, to be rare in the Scottish mesolithic. In northern Europe for example stone tools were placed with burials, whilst flint pebbles, worked in curious fashions, may have been votive deposits in bogs (Mithen 1994: 123; Tilley 1996: 68): neither practice has been recognised in Scotland. This may be a product of post-depositional factors: in Scotland's acidic soils burials would not survive, but there is no pressing reason that Scotland's mesolithic should follow southern Scandinavian practices. I argue that, in fact, we do have evidence for tacit and explicit patterns of deposition in the mesolithic of eastern Scotland. I approach the subject at a series of scales, beginning with landscape patterns, before examining intra-site considerations and micro-scale detail. I then discuss the importance of deposition in pits.

7.5.1: Review

The evidence for stone tool deposition in the east is meaningful but problematic. Many sites are complex palimpsests and it is very difficult to isolate particular episodes of deposition. Post-depositional disturbances can also be significant and the small-scale movement of material by a variety of different mechanisms means that we can often only talk at a generalised level and for many sites conditions of recovery are such that it is simply impossible to interpret the data. Comparisons beyond the confines of the individual structure or scatter are also plagued by difficulties of assessing whether phenomena are contemporary. Some have also argued that the majority of lithic data is derived from episodes of middening, implying that any detailed spatial patterning of lithics is meaningless. This argument appears misplaced as a range of evidence from Scotland's east (see below) and west coasts (*e.g.* Wickham-Jones 1990) as well as Ireland (*e.g.* Woodman 1985) indicates that spatial patterning allows of meaningful interpretation. Detailed excavations at Morton, Fifeness and Nethermills show some patterns, as do recent analyses of material from the Sands of Forvie.

There are clear patterns in the deposition of artefacts at the level of the wider landscape. Whilst we often interpret these differences in terms of the appearance or otherwise of *sites* these concentrations are nothing other than divergent patterns of deposition in differing places. Bonsall (1996), for example, convincingly demonstrated that 'Obanian' midden sites with bipolar knapping traditions, and blade industry microlithic sites are not separate cultural entities, but result from the differential deposition of types of material culture in the landscape. At one level this differentiation results from functional issues, at another it can be interpreted in the light of humanly learnt structures of behaviour: skills and routines. It is for example, notable that many middens were the products of long standing repetitive activities in a particular location – dumping the remains of a shellfish meal. We cannot be sure about the changing context of these activities but we can identify a rather surprising stability in people's attitudes to the deposition of material.

Differentiation in the use of space can also be identified at the medium scale. The best evidence here comes from Morton, especially in terms of the relationship between Morton A and B (J Coles 1971). Although it is impossible to prove categorically, there is sufficient overlap between the radiocarbon dates to suggest contemporary use of the two areas. At Morton A lithics were deposited in association with light structures, scoops, and hearths. On a multi-phase and poorly dated site it is difficult to identify patterns, some material is deposited with respect to structures – in T46 'artefacts ... cluster around the hearths and often lie immediately beside or just beneath the heaped stones' (ibid. 322) whilst in T44/47/55/56.II 'stone artefacts ... concentrated upon two dark areas, one within the walls and a darker are immediately against the southern wall' (ibid. 337) – but in other areas material is deposited only in a low scoop, with no hearth (T44/47/55/56.I). It is interesting that the composition of these industries is so varied (**6.5**) and it seems best to interpret this data as resulting from fairly tacit routines of deposition. Some of the lithics found on hearthstones may, for example, result from clearing a space around the fire, and tossing material onto the hearth. It is notable that no pits appear to have been dug at Morton. The midden (Morton B) is separated from Morton A by 40m of extensively disturbed wind blown sands, with no finds. The midden was formed by discontinuous activities, some of which have created clear levels in the midden. Different groups of tools are found in association with different food remains, and in one instance the distribution of stone and bone tools appears to respect the location of a fire and possibly of individual's bodies (T50/59). Again, the impression is of fairly tacit deposition of stone tools.

However, despite the apparently tacit deposition of material at both sites, the distinctions between Morton A and B are significant. Stone working at Morton A is dominated by formal blade core technology with microliths, utilising a range of raw materials from the region; at Morton B by more flexible approaches to the reduction of local raw materials incorporating bashed lumps and crude choppers – formal stone tools are rare. Coles argues that the heavy choppers were not manufactured on the midden (ibid. 314) hinting that although expedient, the processes involved are complex. 38 bevel-ended tools are also found at Morton B, although not at Morton A, and ochre pencils are found only on Morton A. This range of factors suggests that some structures existed to the use of space by individuals at Morton and the presence of a single microlith on Morton B may imply that these categories were not absolute rules, but important structuring principles. The longevity of occupation at Morton implies that the principles underpinning depositional activities were repeatedly enacted: long-lived, and not the product of chance. This is also evident at Low Clone (Cormack & Coles 1968) where the excavators argued for seasonal occupation at a spatially differentiated site. Similar patterns may be apparent in the Tweed Valley, where broad-level spatial differentiation is apparent at Manor Bridge (Figure 248-250, **App 2.3**). Similar patterns may become apparent with further work in the complex landscapes of Forvie, where, despite difficulties with date, differences can be identified between activities in different areas across the study area as a whole.

Further details are apparent by examining small-scale patterns in the deposition of artefacts. This has already been highlighted at Morton and is also clear at Forvie. As noted above, there is possible differentiation across the whole of the study area, and important differences between concentrations of knapping activity (**6.4**). The sample of material obtained in 1999 also allows an examination of activity at a small scale (Figures 306-322). The surfaces discussed are comparatively undisturbed, although the possibility of small-scale movement of artefacts is significant. The main scatter lies within and to one side of a scoop on the MPGT beach with fewer artefacts found above or below this feature. A small group of retouched pieces, including diagnostic mesolithic types are found immediately beneath the sea cliff. It is not clear whether these artefacts are *in situ* or redeposited, and they are excluded from the discussion that follows.

The centre of the scatter has a concentration of burnt material (Figures 316-318). Formal cores are found in low numbers throughout the depression and are very rare away from this feature (Figures 319-321). However, they are also rare in the area of central burning. They consequently have a 'hollow centred' distribution. Core rejuvenation evidence is also found in the same area. In contrast bipolar material is comparatively rare in the depression, but found across the rest of the study area (Figures 311-313). Bashed lumps and split pebbles are also infrequent in the scoop, and seem to cluster just above it (Figures 308-310). Irregular flakes are frequent throughout the study area but blades are more frequent in the scoop, although not in the very centre (Figures 314-15). Retouched tools are also concentrated within the depression and there are some interesting patterns to this data (Figure 322). Scrapers are found at the side of the central scatter, and burins and gravers are also found to the edge of this focus. Microliths are found throughout the study area, and are the most frequent isolated finds above the scatter itself. Microburins are also distributed widely, but notable concentrations just to the side of the burnt area may indicate a concern with production here. A number of themes may be significant. The pattern of material in the scooped area is suggestive of a pattern of activity focused around a fire. Productive activities, including formal cores, core rejuvenation and possibly microburin techniques were significant around this centre. Other activities were marginalised, scrapers are found to one side of the scoop, whereas burins and gravers are more marginal still. It would be easy to stretch this data too far, and some extent of post-depositional movement is likely, but the indications are of material that has been deposited through fairly routine actions of making and doing that appear to have had some structure.

Parallels are difficult to identify. Nethermills and Fife Ness are broadly comparable but also indicate some concern with the deposition of material in pits. Nethermills is difficult to interpret from an interim report, but flints were found in and around a series of pits, some of which likely formed a circular structure. Lithics are found widely in the area, presumably disturbed by the plough, but they appear to be related to the structure: the '...finds distribution suggests that the wider gap between posts d and e may represent the entrance' (Kenworthy 1981: 3). Lithics are also found throughout various pits; 'the function of most of these pits is unclear, but some appear to be flint-working hollows, fire pits and domestic storage pits' (Boyd & Kenworthy 1992: 11). At Fife Ness flints were deposited in association with a living floor and irregular pits and possible structure. There is little sense of spatial differentiation in the finds; cores are common in the occupation soil although knapping debris is not particularly frequent, whilst burnt material clusters to the east near the arc of pits. Lithics, sometimes burnt, appear to have been frequently deposited in pits (see below).

Fife Ness and Nethermills give some hints of movement of flints into pits, as well as material remaining on the surface. A pit, filled with carbonised hazelnuts, charcoal, burnt lithics and fire-affected stones at Manor Bridge suggests that these activities were fairly widespread. It is difficult to understand details, but this hints at some complexity, and these sites suggest that we must consider the significance of pit digging in the mesolithic. Indeed

> 'Mesolithic sites are notorious for comprising unexplained pits, and it is impossible to imagine all the daily activities that took place and the features that were required for life in a hunter-gatherer community. Nethertheless, *pit digging and their subsequent filling with rubbish or other material was clearly an important aspect of mesolithic life*' (Wickham-Jones & Dalland 1998: 6.1)

Despite the difficulty of interpreting pits in functional senses, it is possible to make some comments about the significance of pit digging. In the first instance we should note that this is a very specific form of activity. Whilst storage pits may be explicable by reference to functional need it is very difficult to interpret the filling of rubbish pits with flint and other debris in this light. It is possible that concerns with cleanliness and hygiene were significant, although the argument that surfaces covered in flint debris were dangerous does not appear relevant given that some material is evidently deposited in and around structures. In any case, the excavation of pits appears to have happened in unusual locations. At Fifeness, for example, pits were dug very close to the fire and, presumably the centre of activity on the site. A similar situation may be apparent at Nethermills and it is likely that mesolithic pits should not be interpreted simply in terms of functional need, but with respect to other factors. The evidence from eastern Scotland is slim, but two unusual mesolithic pits may be significant here: first F41 at Fifeness, and secondly F619 at Spurryhillock.

Pit F41 is oval in shape (*c.* 98 x 90cm) with near vertical sides and a flat base (Figure 323, see also Figure 10). It is approximately 35cm deep and, given the preservation of the site in a slight hollow in the subsoil, appears not to have been significantly truncated. The pit has three fills: two of loam with a small layer of sand in between. The two loam layers include large numbers of lithics (38% of the assemblage in total), of broadly the same type. What is interesting about F41 is that it has clearly been re-cut at some stage, then left open for long enough for a small layer of sand to form, before a second loam deposit has built up. The distinction is clear in the section and is also indicated by the different proportion of burnt material in the fills (F40 22%, F45 12%). The difference in date between the two events is impossible to interpret but given that the site is likely to have been short lived, is probably not extensive. It may also be significant that F41 contains the largest quantity of lithics of all pits, has the most regular shape, is differentially burnt to other parts of the assemblage, and is set furthest back from the fire and 'living floor': the excavators comment that 'it seems likely that these fills had resulted from very different activities to those of the other pits' (Wickham-Jones & Dalland 1998: 6.1). The reopening of the pit is an interesting act, and difficult to interpret in purely functional terms, suggesting some interest with deposition acts in themselves.

Pit F619 at Spurryhillock, near Stonehaven is also unusual. This is a truncated rather irregular, very large pit (2.3m x 1.8m and surviving to 1.35m in depth) (Alexander 1997). This pit has infilled over some time after opening and contains at least ten clearly identifiable layers of fill, alternately of charcoal and sand, before final deposits of silt. No lithics are known from the lower layers of the pit, although a single flint blade was found in the upper fills. It would be easy to make too much of this site, but the pit is, again, difficult to interpret in a functional sense and suggests some concern with digging as a particular form of activity.

At Cowie Road, near Stirling, a u-shaped pit enclosure offers some indication of these concerns during the complex mesolithic-neolithic transition (Rideout 1997). During Phase 1 roughly circular pits, with steep, often vertical sides and a flat bottom had been dug into a gravel terrace. These pits contained very few artefacts and appear to have silted up naturally. Many of these pits were later reopened, the original fills removed and off-centre stone linings inserted into steep circular pits (Phase 2). Extensive burning evidence suggests that plank linings were burnt in some pits. Finds included carinated pottery and a range of lithics with mesolithic affinities (ibid. 49), including pitchstone. Dates from Phase 2 vary: P6 returned 3 dates from oak of *c.* 5135 BP[72] and P25 a single AMS date of 4830±60 BP (AA-20412). Phase 2 was not one synchronous act and may be best understood as the result of repeated patterns of activity over some time. Although the chronology refuses resolution, here we see clear suggestions of the importance of pit digging and deposition during the mesolithic-neolithic period and with hints that this has clear 'mesolithic' affinities. The Phase 1 pits may even fall into the mesolithic period as traditionally defined.

This evidence is rather uneven, but it does suggest that pit digging, and presumably the deposition of material in pits during the mesolithic, was not simply a functional matter, but incorporated a wider series of concerns. In this sense pit digging has something in common with the deposition of specific types of material at specific points in the landscape that led to the formation of middens. It is a meaningful and historically specific social activity, a tradition that can only be explained by reference to the ways in which agents came to know the world. Pit digging in the neolithic has received a great deal of critical attention as a meaningful, structured activity (Edmonds 1999: 29ff; Thomas 1999: 64ff) and it seems unfortunate, if unsurprising, that the data for the mesolithic has been so under-explored. This is not to say that our interpretations of mesolithic pits should slavishly follow interpretative standards created for the neolithic, but we should have paid more attention to the potential for interpreting our data in terms of socialised, meaningful activities. This is particularly striking given that pit digging provides one way of approaching the mesolithic-neolithic transition through a single data set.

7.5.2: Discussion

At the beginning of this discussion I proposed that we might understand the deposition of stone craft in two ways. We could consider deposits that had tacit meaning, generated through routine activities, and those with explicit meaning, deliberately deposited in order to say something about the ways in which the world was understood to work. Both types of deposit would have contributed to how people came to know their place in the world. I noted that

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[72] Average of AA-20409, AA-20410, AA-20411.

although the subject of stone tool deposition was under-theorised in mesolithic archaeology, it appeared that explicit deposition was rare. I hope to have demonstrated that the reality during the mesolithic was more complex even if many of the details are still obscure. Structures of behaviour led to the deposition of stone-tools and other artefacts at a variety of scales from the wide landscape to the organisation of space around a fireplace or windbreak. In many instances it seems that these artefacts have been fairly mundanely deposited in the course of undertaking varied tasks. In some places we can begin to assess spatial variation in these tasks, presumably a particular articulation of some kind of organisation of activity. These patterns are always fuzzy, and this may imply that the structures within which people generated material were not so rigid as to preclude invention, or play. It would not be appropriate to interpret these patterns too closely and certainly not to view them in the light of gendered off-the-peg ethnographic analogies but they do present us with the potential for understanding the contexts in which action took place in the past. In any case, the associations stone tools gathered through these kind of deposits were often tacit, relatively understated, although nonetheless significant for that.

But at other times we can see hints of more explicit statements being made with stone tools, especially when they end up in pits. The data is difficult to interpret, but the evidence of pit digging is suggestive of a concern with more than simple functional matters. It is possible that digging pits and placing material in them made an explicit statement about events that had happened in this location, or events that one wished to happen in this location. It is interesting that these hints of symbolic behaviour involving stone and rubbish more generally appear to happen alongside the tacit deposition of material.

In conclusion, the evidence of stone tool deposition hints at complexity. A range of associations can be identified, at differing scales. There is little sense of categorical separation between mundane deposits and those that may have been more explicit. We are not dealing with rigidly separated fields of activity, but of a series of alternatives: in certain contexts maybe it was appropriate to bury rubbish in particular ways, at other times, it was not. The tacit and explicit are connected in the same ways as daily life and ritual, each generates potential for the other.

7.6: Discussion

Rather than analysing prehistoric stone-tools as indicators of some kind of socio-cultural affiliation, in this chapter I have examined stone-craft as a social phenomenon, paying attention to the contexts of procurement of stone, some structures and routines of craft and considering the ways in which stone-tools were discarded. Stone tool production, analysed in this way, allows us to begin to examine the interplay between social reproduction and the archaeological record. At this stage I have been able to do little more than show the potential of the eastern Scottish material for these analyses, further sampling of sites and better chronological controls will be required to try and track trajectories of change and activity in prehistory. But the account presented shows the complexity of the data, and the potential of the approach to inform us about the possibilities for action in the past.

Part 3: Review and Prospect

'The way we will understand the archaeological evidence is, therefore, not by some once and for all methodological procedure, but by the active and imaginative creation of history.'

(Barrett 1994: 88)

Chapter 8: Towards a social archaeology?

> 'apprehending the world is not a matter of construction but of engagement, not of building but of dwelling, not of making a view of the world but of taking up a view in it.' (Ingold 1996a: 121)

> 'The recovery of history involves the recovery of materiality and specificity.' (Steinberg 1996b: 8)

The aims of this project were twofold:

- to introduce the evidence from eastern Scotland and to begin to suggest frameworks for coming to terms with these data
- to contribute to the generation of a social archaeology of the mesolithic period

In this final chapter I discuss the extent to which these aims have been fulfilled. In order to highlight the potential of the approach I consider distinctions between the mesolithic inhabitation of northeast and southeast Scotland. Finally I offer suggestions for areas of future research.

8.1: Finding the frameworks

The data enabling contemporary interpretations of the character and extent of mesolithic settlement in eastern Scotland are varied and subject to severe biases. Stone tools, many of which come from surface contexts, dominate the material evidence, and the number of known sites with structural evidence is slim. The stone tools themselves are also understood in relatively crude terms, and it is likely that the analytical category of 'later mesolithic' obscures important variation in stone craft. These problems are particularly significant given that so few radiocarbon dates exist from the area and that we are often reliant on stone tool typologies in order to construct our narratives. Acid soils have contributed to the infrequent survival of faunal material: there are few bone tools known outside of coastal or estuarine contexts and no faunal evidence away from shell middens, which are still poorly understood. Preservation conditions in the east are generally poor; in the lowlands agriculture is often intensive, and the plough has destroyed many sites, which are now found only as surface scatters. However occasional pockets of survival can be identified at Nethermills or Manor Bridge for example, and the east has rich potentials. In the uplands peat cover masks large areas of the mesolithic landscape, and contemporary archaeological practice has tended to neglect the opportunity to utilise forestry ploughing in order to assess the distribution of lithics in upland areas. Landscape change, at a number of levels, has been significant and the study of gatherer-hunter landscapes of the past must include geomorphic and environmental analyses. Sea level rise and fall is a major biasing factor, implying that large parts of the mesolithic landscape are effectively lost to contemporary analysis unless extensive and expensive programmes of underwater survey are undertaken. For these reasons, as well as the comparative neglect of the area by archaeological practice, the spatial extent of mesolithic settlement in the east remains a little obscure. The significance and complexity of biasing factors imply that our understanding of the true distribution of archaeological materials in the present is flawed. These biases are impossible to model at regional scales: but must be interpreted with respect to detailed local case studies.

Notwithstanding these problems, the data from eastern Scotland can and should be interpreted. It is impossible to quantify and delineate the mesolithic of eastern Scotland and I have presented a more qualitative account of the evidence and the period. This has stressed the *characteristics* of the material available to us; generating a series of broad frameworks, as well as more detailed studies, with which to interrogate that evidence in terms of human lives. Further research is vital (see below), but the mesolithic of eastern Scotland does not appear to fit comfortably into the dominant interpretative tropes of mesolithic archaeology: for example complexity, specialisation, and coastal adaptation. Indeed, I have argued that these dominant models are poor constructions of human lives in the past, suggesting that an alternative focus on social reproduction is a more appropriate analytical strategy.

Many models of gatherer-hunter settlement in northwest Europe have stressed the importance of the supposed regularities of economics in dictating patterns of movement, and have often interpreted these rhythms in terms of a well structured seasonal round (**3.1**). There are serious theoretical and empirical difficulties with the application of these models to eastern Scotland. The chronological and spatial resolution of the archaeological gaze is such that the variability characteristic of ethnographically observed gatherer-hunter's routines of mobility will often remain elusive and it is simply not clear to what extent our models normalise these variations. Furthermore, the extent of bias in understanding the distribution of archaeological materials means that we are unlikely to be interpreting a full gatherer-hunter landscape. These factors imply that any detailed, structured model of gatherer-hunter settlement in eastern Scotland is likely to be flawed.

In fact there are a number of reasons to argue that a flexible, opportunist strategy may have been common in the period, especially given topographic variation and significant climatic and environmental change. Although poorly understood, and frequently downplayed by normalising analyses, there is considerable variation in material culture in the eastern Scottish mesolithic. This is most evident in lithics, the dominant evidence class for the period, but can also be observed in the range of structural evidence. Sites do not resolve themselves into easy categories either, although better samples may help to resolve these difficulties. Some kinds of locations do appear to have been significant locations for gatherer-hunter settlement, for example river junctions in the Tweed Valley, but in this area there are also clear indications of a more generalised use of the prehistoric landscape and it is difficult to establish comparisons between these varied parts of the prehistoric landscape.

There is little evidence for highly specialised economic practices in the east. There are some hints of this with maritime resources but it would be easy to make too much of this data. In any case, most coastal sites, such as Forvie or Morton, appear to have been frequently visited locations rather than the sites of long term aggregations. There is no direct evidence for the intensive exploitation of salmon or other anadromous fish, although preservation conditions are not favourable for the range of organic gear that may have been significant. Initially surprising, this lack of evidence for the importance of such an intuitively attractive resource has some parallels in northwest Europe and may be explained by patterns of fish behaviour in the early Holocene, especially given sea-level instability. However fishing seems likely to have been socially significant; for example, hints of complex assemblages in association with good fishing locations, especially in the Tweed Valley, may imply that these were important places for gatherings of the larger community. The evidence for forest 'management' in the eastern mesolithic is ambiguous, and possible to read in terms of non-mechanistic relationships. In any case, our images of the character of natural woodland have not done justice to the spatial and temporal complexity of these environments, which were not always dominated by thick closed canopy woodland but included a variety of spaces. In Scotland's diverse, glacially marked landscape this variety may have been more significant than the older landscapes of England.

There are such serious theoretical difficulties with the concept of 'complex hunter-gatherers' that the continued archaeological use of the framework should be questioned. Originally the term served a useful purpose in demonstrating that gatherer-hunter groups were not solely characterised by mobility and egalitarian relationships but in contemporary archaeological practice the continued use of the term can be argued to create a false interpretative dichotomy (**3.2**). Rather than use material culture to signify a state of complexity a more appropriate focus for analysis is to examine the ways in which material culture contributed to particular possibilities for social relationships. For example a range of evidence from the eastern Scottish mesolithic allows us to suggest that the material world enabled the establishment of some differentiation between members of the community. The extension and management of networks of personal relationships across the landscape as a whole, for example, is implied in the small-scale exchange of raw materials seen in the analyses of the Sands of Forvie and the Tweed Valley. Some items, such as harpoons, may also have been associated with rather specialised tasks; perhaps not carried out by the community as a whole. The manufacture of cords/nets and of ground stone tools in the central Tweed Valley is also interesting, as these kind of labour intensive items may have marked out distinctions between people; for example between makers and users or owners and borrowers. A few hints of decorative materials, from ochre pencils through to possible amulets, may also imply that categorisations of personhood could be maintained from these media. Many of these associations between materiality, people and social reproduction are likely to have been fairly tacit, and resistant to the scales at which archaeological narratives operate, especially given the relative paucity of material evidence for the mesolithic. However it is possible to construct analytical accounts of these processes, as for example in the study of the Sands of Forvie offered in **6**.

The issue of the character or significance of chronological variation at different scales in the eastern Scottish mesolithic is difficult to resolve. There is a small amount of evidence for early mesolithic settlement, but it is very difficult to interpret this material in terms of meaningful patterns of activity. In the later mesolithic there is a wealth of problematic evidence, but at this stage of analysis there is little sense of any chronological development within the period. Middens appear to only become important in the later part of the later mesolithic; but this is difficult to interpret given the extent of sea level change. In any case lithic sites in both pre- and post-transgressive contexts imply that the coast was always a part of gatherer-hunter landscapes. The evidence for forest 'management' varies, and most of it may fall towards the end of the period, but much more research is necessary in this field, especially given the complexities of the mesolithic-neolithic transition. These difficulties in understanding change over 3500 radiocarbon years offer further support to the idea that we should not attempt to map gatherer-hunter settlement too closely.

Problems with the database are certainly significant in determining contemporary understandings of the eastern Scottish mesolithic but, to my mind, they do not account for all of the distinctions between the data-set and derived expectations from other areas; for example Scandinavia or western Scotland. In the light of the studies undertaken for this project some general frameworks can be highlighted at this stage. I believe it is likely that gatherer-hunters in eastern Scotland subsisted by a fairly generalised economy, at times laying different emphases on particular affordances of the environment: in some seasons, rivers, at other times small lochans or mires in the hills, at yet other times the coasts. The details of this practice are obscure and intensive local studies are required to resolve many questions. The particular patterns of activity changed at innumerable scales, from the season through the lifetime to the millennia.

The gatherer-hunters of eastern Scotland appear to have been a non-sedentary population, and their experience of the social world was therefore mediated through a series of different aggregations. At times this may have been in small family groups, at other times a much wider community; these variations are important to any understanding of gatherer-hunter experience of space. It is likely that certain types of material practice contributed to the generation and maintenance of distinctions between people but it is not clear that this equates to an idealised 'complex' economy. Change over time is impossible to assess at any level of detail, but these combined processes created certain opportunities for the creation of socialised humans. These processes are difficult to analyse, but do require archaeological attention.

8.2: Social archaeologies of the mesolithic

The second aim of the thesis is to contribute to the generation of social archaeologies of the mesolithic period. Traditional narratives of the mesolithic are both dehumanising and, ultimately, uninformative as they choose to focus upon reified units rather than the interplay between human agents and materiality that creates the possibility for types of knowledge and therefore behaviour. The study of social reproduction in small-scale communities is closely tied up to the examination of patterns of behaviour across a socialised environment, or in other words, a landscape, and in a broad sense this project has been an interpretative landscape archaeology of the eastern Scottish mesolithic. However there are significant differences between the approach to landscape developed herein and those often seen in contemporary archaeology. Approaches such as Tilley (1994), for example, are culturalist landscapes of myth and legend imposed willy-nilly on the archaeological record. The probable importance of dominant cliffs and rock features in structuring mesolithic landscape use is of interest as an alternative to models stressing economics, but as Tilley's phenomenology is deeply acontextual, ahistorical, and post-modern it offers no potential to analyse social reproduction in the mesolithic. In contrast Ingold's new ecology offers a more fine-grained understanding of the ways in which patterns of skilled activity are caught up in the maintenance of identity and understanding. Although these theoretical perspectives are powerful, Ingold does not offer an archaeological methodology, and in this project my focus has been on examining situated skills and traditions of behaviour in order to provide an analytical approach to considering social reproduction in the light of his theoretical arguments. In terms of method this has translated into a focus upon the structures underlying stone working and the procurement of stone working materials. For example, the account of the lithic industries of the Tweed Valley shows how, at one level, subtle differentiation in the treatment of raw materials might be interpreted in terms of agents in the past manipulating the structures available to them. Given sampling problems, differences between sites in the region are difficult to interpret, but it seems that the varied raw material availability in the region was caught up in historically specific structures of expected behaviour. Further work is required to understand these complex processes, but the studies offered demonstrate that the database has the potential to answer these kinds of questions.

The account of Forvie demonstrates how approaches to tradition and the interpretation of context can be used to pick apart superficially similar 'later mesolithic' scatters. The two scatters at Forvie can be interpreted as demonstrating significant differences in the context of people's experience of place. It is not possible or appropriate to interpret the reasons behind these differences too closely – a preferable approach is to allow a number of readings of the potential of the evidence.

Both studies are, at present, fragmentary and it is difficult to assess the potential influence of chronological factors in creating patterns of difference and similarity. But they clearly demonstrate that a focus upon skill, context and materiality can inform us of some of the characteristics of social relations in the mesolithic. The accounts of salmon fishing and woodland management are a little less successful as studies of social reproduction, although I hold by the interpretative stresses offered. In these studies the difficulty of identifying material to employ in interpreting patterns of skilled behaviour has profoundly influenced the level of analytical engagement achieved, which remains rather generalist. This in turn highlights the central importance of material culture rather than broad cultural analogues in understanding day-to-day patterns of activity in the past. My discussions of landscapes make little reference to myth beyond noting the likelihood that many places would have been caught up in varied narratives about the ways in which the world was supposed to have worked. The details are not significant as analogues, but the interplay between the seemingly mundane world of archaeological material and symbolic belief in the mesolithic is important and can be carefully highlighted by such accounts.

One theme of interest to a social archaeology arises from shifting the focus of our narratives away from the supposed routines of economics to considering the temporality of landscape. Again, here some studies have not been as successful as hoped, and the character of the taskscape remains rather obscure, but a series of temporal associations can be noted. These range from the possible tastescapes of the seasons through to patterns of seasonal movement. One very interesting area for consideration is the comparative time depth of gatherer-hunter locales. The evidence suggests a rich range of places – from those occupied only transiently to those repeatedly visited; some, such as Morton, over many millennia. It is difficult to assess how aware of the history of these places gatherer-hunters may have been; in some instances material prompts such as quarries, carved trees, clearings or middens may have reminded people of a time long before their own.[73] At a smaller scale stray stone tools discovered in tree throws may also have provided reminders of other visits. A hard worn footpath might be testimony to the larger gathering of people who had stayed in this place during the summer. Some of these oft-visited sites may be little more than coincidental palimpsests, others seem likely to have been significant named locations in the past: redolent with complex, varied associations. As noted above, gatherer-hunters were likely to have had an uneven social experience of landscape; at times coming together to form large groups, whilst at other stages passing through little visited areas as a small family, or task group, or a party visiting neighbours. These rhythms of social life, of tending to and maintaining varied relationships with kin and associates, provided another set of temporal references.

It would be easy to make too much of the data available, and in retrospect the attempt to use such a problematic database has caused serious difficulties with the attempt to analyse rather than describe these processes. The slightly fragmentary feel of the case studies offered arises directly from these difficulties. A more tightly focused diachronic study, examining for instance the mesolithic-neolithic transition in a particular region, may be able to highlight the interplay between social reproduction, the community and wider historical phenomena (see **App. 7** for a generalised discussion). However the studies I have presented so far demonstrate the potential of the approach taken. The ways in which a focus upon landscapes, contexts and experience can reveal some of the possibilities for human agency in the past is also revealed by a comparison between the northeast and southeast of the study region.

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[73] See Gosden & Lock 1998 for a discussion of the time depth of non-western genealogical histories

8.3: Regional identities?

A number of interesting differences can be identified between the contexts for human experience in the northeast of the study region (broadly speaking Aberdeenshire and region) and the southeast (the Tweed). This is not to imply that these are defined social territories, or that there was little or no mesolithic occupation in the areas in between. In any case, to my mind it is likely that there was contact between people living in the two areas. Notwithstanding the lack of direct evidence for contact, long-distance links between people within small-scale societies are relatively common, if not part of everyday life (Helms 1988). The aim of the following study is only to highlight comparative distinctions between the mundane experience of inhabiting the landscape in the two areas.

The areas have slightly different distributions of archaeological material (**3**). In the Tweed there is clear evidence for a range of activity away from riverine contexts, especially in the broken terrain of the middle valley: broadly speaking on an ecotone between lowland oak forests and upland forests. In the northeast this is not clear. On the Dee and in Strathnairn no mesolithic activity can be identified away from the riversides. This implies different routines of behaviour and movement in the landscape[74]. The reasons for this difference are not clear, but may be related to environmental conditions in the areas (**4**): the woodlands of the northeast were different in character to those in the southeast and it is also possible that they saw less human disturbance.

Possible distinctions in riverine resources may also have been important (**5**). Salmon may have run slightly earlier in the north than the south, and Aberdeen Bay was a good location for immature sea trout. Although difficult to interpret in absolute terms these differences may have had important influences on the seasonal scheduling of activity, and consequently on the temporal structures within which people in the two areas came to know the world. Further rhythms may also have been significant; for example, the aurora borealis (northern lights) may have been more frequently visible in the northeast than the southeast, as they are today. Aurora are created when charged particles from the sun are captured by magnetic belts running around the earth which guide them into polar regions where they collide with gas molecules and glow. The movement of the magnetic pole creates differences in the distribution of the aurora, and the exact frequencies observed now are unlikely to have been

[74] It may also be significant that, whatever their purpose, waisted pebbles are unknown in the NE.

significant in the past (Falck-Ytter 1983). However the distinction between north (more frequent) and south (less frequent) is likely to have remained. Today, as well as being more frequent in winter, the aurora operate on a series of discernible rhythms; for example an 8-16 year solar cycle (average 11.1yrs), and a *c.* 27 day cycle (Henderson & MacNichol 1997; Falck-Ytter 1983). In the northeast today the aurora appear two or more times a month, sometimes displaying for 2-3 days in a row. It is in many senses a routine part of the night sky, although its character on any given night varies and the most spectacular displays are rare (Henderson & MacNichol 1997)[75]. Although the absolute frequencies of aurora are impossible to reconstruct, the absence of light pollution in the mesolithic will have contributed to greater visibility of aurora and it seems likely that its comparative frequency was an important part of the historical experience of the two areas; in the northeast the aurora was possibly a very much more mundane experience than in the southeast. It is possible that this distinction was also embedded in slight differences in cosmological beliefs between the two areas; ethnographic studies suggest that appreciable local variation is possible within similar sets of belief and cultures (*e.g.* Barth 1987).

Further distinctions are notable in the raw material exploited in the areas. Although detailed comparative analyses of the stone-tool industries of the northeast and southeast have not been undertaken, the raw material variation in the Tweed Valley is not paralleled in the northeast. This implies that the particular structures of procurement and production identified in the Tweed (**8**) are unlikely to have been routine to those in the northeast; especially if the chert quarrying is mesolithic in date. Of course, subtle conventions and skills certainly existed in the northeast, but these are likely to be different in character to those of the southeast given the significant material differences between the raw materials available. Such learnt structures of behaviour, although often tacit, provided an important part of the process of enskillment and consequently identity.

These themes are far from exhaustive, I have not for example considered the influence of the coast on patterns of activity, but distinctions in landscape use, in some temporal structures and raw materials point to differences in the character of the historical environment, or landscape, within which people acted in the mesolithic. Although the details refuse resolution there are also indications of differential patterns of learnt behaviour and expectation in those areas. Far from engaging with an homogenous or abstracted eastern

[75] The *character* of the aurora has also changed since scientific observations began and many early accounts stress the noise made by the phenomena.

Scottish mesolithic a focus upon on social reproduction and the learnt world allows us to discuss distinctions that may have been important in the past.

8.4: Prospects

Much more research is needed on the varied mesolithic communities of eastern Scotland. In a broad sense any research is to be welcomed, as the database is still fragmentary. The frameworks suggested for mesolithic settlement in the east require assessment and varied research programmes are needed to further analyse the influence of the coast and the nature of subsistence practice. The interpretative accounts offered also require further resolution in order to assess their relationship to diachronic processes. It is therefore appropriate here to indicate areas of future research directly arising from this project, both continuations of this work and those at slight tangents.

A range of further work is needed in order to characterise the **chert quarries of the Tweed Valley** and the context of their use. Extensive walkover survey of chert outcropping regions in order to identify and survey further quarries is a priority. Samples of material should be obtained from all areas in order to assess the potential for differentiating between material from different quarry sites. Further excavations in the area of quarries are required, a trial excavation of the anomalous large platforms at Flint Hill or Wide Hope Shank is a priority, and test pit excavation of areas surrounding quarries will be important. Test pit excavation in order to delineate and sample the important blade core scatters identified from surface finds at Stobo Hope Head and Clashpock Rig is also recommended. Surveys of river and streambeds for pebble deposits of chert should be undertaken.

An intensive long-term multi-disciplinary project in the **upper Tweed Valley** should be considered given the wealth of gatherer-hunter settlements being identified by fieldworkers such as Knox. This project should incorporate fieldwalking, test pitting, and excavation in order to assess a large block of varied landscapes in valley bottoms, hillsides and hilltops. Geomorphic and environmental analyses should be incorporated in order to generate models for this area. Detailed surveys of raw material availability in the area should be considered. Further excavation in the preserved contexts at Manor Bridge, the Popples should be undertaken in order to assess the extent of mole disturbance and retrieve securely contexted material for radiocarbon dating. An extensive test pit campaign is required in the area surrounding Manor Bridge in order to delineate extent of activity at this river junction. Such a research programme would retrieve a large quantity of lithics, and this would permit further examination of the structures of prehistoric stone working over time, and this in turn will enable the resolution of the ambiguous patterns identified in Ch. **8**.

In the **middle Tweed** a comprehensive analysis of antiquarian collections should be considered in order to identify collectors' biases/preferences and fully assess the character of the data. Continued assessment of the geomorphic context of the larger scatters is required and controlled samples of stone-tools from all the major sites should be obtained in order to establish a base line for comparisons between sites in the region. A survey of raw material in the area is required. The source of the chalcedony needs to be identified and detailed analysis of the characteristics of the flint in the industries is also required. The comparative lack of sites in the Merse should be tested by field survey.

In the **Lunan Valley**, extensive fieldwalking in conjunction with detailed geomorphic mapping is required to assess the distribution of all lithic material. Fieldwalking is also to be recommended in many of the 'blank' areas of our distribution maps such as the Lothians, the Don or the Tay. In the **uplands** integrated test pitting and geomorphic survey are required to identify mesolithic activity. The methodology adopted in the survey of Calletar, although intensive, offers one example of such an integrated approach. Post-ploughing assessments of forestry ploughing are strongly recommended in order to interrogate the character of settlement and the effectiveness of the current structure of archaeological response.

Further work is also required at the **Sands of Forvie** and region. Unfortunately this in part derives from the need to preserve fragile remains by record, but there are still valuable research questions to be answered. Further sampling of the exposed working floors including comparisons of different areas in the dune complex will enable a continuation of the interpretative studies offered in **6** whilst micromorphological analysis of palaeosols on these surfaces will clarify formation processes. Trial excavation of middens should be considered in order to establish their date and, if mesolithic, further excavation should take place. This should include test pit survey incorporating soil analyses on the vegetated raised beach surrounding the middens, in order to identify patterns of activity surrounding the midden. Comparative studies with the Ythan estuary and hinterland are also required and extensive local fieldwalking should be undertaken. A trial excavation at Mains of Waterton rockshelter should be considered. A detailed assessment of local flint resources is needed.

These themes indicate some directions that further research on the mesolithic communities of eastern Scotland might follow. The more detailed recommendations outlined offer an integration of data collection with the need to study social reproduction stressed throughout this text. In a seminar at the University of Edinburgh I was asked whether the mesolithic of eastern Scotland required more theory or more data. The answer, of course, is both: and the two must develop together in order to form an archaeological reality amenable to a human history of the period.

8.5: Review

In this thesis I have been concerned with establishing methods of interpreting mesolithic lives in the landscapes of eastern Scotland that allow us to pay attention to the humanity of our subjects, rather than to analytical objects created in the contemporary world. I have focused on the interplay between material conditions and the possibility for forms of knowledge arising from action within particular contexts in eastern Scotland in the early Holocene. Of course, many of these matters seem intangible, but a focus on the materiality of skills and routines provides us with a way of addressing these issues that does not rely on the semi-fictional vignettes that often preface contemporary archaeological narratives (*e.g.* Whittle 1996). At times I feel I have been successful, although further work is needed to flesh out the potentials identified in more detail. The studies offered demonstrate that as archaeological analysts of the human past we do not face a stark choice between objective rigour and the subjective, romantic interpretation of mesolithic lives, because by a sensitive engagement with the materiality of those lives we can make assessments of the significance of landscapes, contexts and experience in the past. To my mind the choice we have to make has more to do with the kinds of narratives we desire of archaeological practice in the twenty-first century.

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Towards a social archaeology of the mesolithic in eastern Scotland:

landscapes, contexts and experience

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Volume II: Appendices and Illustrations

VOLUME II: APPENDICES & ILLUSTRATIONS

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Appendix 1: The Knox collections from the upper Tweed Valley

This report describes the collections of 1,444 lithic artefacts made by Mr Bob Knox of Peebles. Over many years from the 1980's Mr Knox collected chipped stone artefacts from erosive and plough soil contexts from the fields and footpaths near his home (*e.g.* Cowie *et al.* 1986a, 1986b, 1986c; Knox 1989, 1994; Knox & McKean 1993a, 1993b; Knox & Finlayson 1989; Knox *et al.* 1989). In 1998 he donated these artefacts to the author, as part of doctoral research into the character of mesolithic settlement in the Tweed valley.

1.1: Collection standards

Excavations were undertaken on three of the sites identified by Knox: at Manor Bridge, the Dookits and Shiplaw (see **App.2** for details). At Manor Bridge, a large sample of excavated material could be compared to Knox's surface collections from the site, enabling some assessment of collection standards. A number of areas can be examined: raw materials, size and type of artefact (Figure 2). All spoil was sieved at 5mm.

Flint is slightly over-represented in the surface collections, but only by a little, and it seems that surface collections adequately represent the raw materials utilised at Manor Bridge. Examination of the size of finds made also reveals little significant difference: surface finds are slightly larger but the differences are small. Excavation recovered the smallest pieces, and these artefacts range in size a little more than surface collections. An examination of the types of artefact recovered provides the clearest indication of the bias inherent in surface collections. Regular flakes and blades are over represented in the surface collections, probably indicating the greater recognition of these regular artefacts. This is also reflected in the preferential collection of retouched artefacts. However Knox also collected many chunks (more than recovered in the sieve) and there is evidently some complexity here. Notwithstanding this, the over representation of formal artefacts and retouched pieces in the surface collections made by Knox is not extreme. In general the surface collections from are representative of the material recovered by excavation.

The Manor Bridge collections are the largest single assemblage in the Knox material and were collected over a long period of time. It is therefore possible that some of the smaller assemblages are not as representative as these collections. However, it would not be appropriate to be too cynical of the standard of these collections. Knox is a very attentive archaeologist (pers. observation) and I have little reason to doubt that the larger assemblages in his collections are an adequate representation of the surface remains. Of course it is not always possible to assess the relationship between surface remains, especially in erosive contexts, and the extent of the scatter itself.

1.2: Review

The 1,444 artefacts collected by Knox are from fifty-eight locations in the upper Tweed valley, ranging from ploughed fields through to erosive footpaths higher in the hills (Figures 23-25). The number of artefacts also varies, sixteen locations are single finds only, and thirty-nine have less than ten artefacts whereas six locations have over 100 artefacts and 304 are from Manor Bridge. Some of these assemblages then, are unlikely to be 'sites', but may reflect 'background' levels of prehistoric activity in the area. Other locations are clearly 'sites', and these assemblages are of great use in interpreting both the character and extent of settlement in the area. Here I present a review of individual sites; discussion of the significance of these sites is included in the main text. All artefacts were examined macroscopically and catalogued according to standard descriptive procedures. Where possible the extent of platform preparation was noted. The sites are ordered alphabetically. Sites with single undiagnostic finds or sites that were later excavated are not discussed here, with the exception of the material from Wide Hope Shank. Therefore Knox's collections from Manor Bridge 'Popples', Manor Bridge 'Cow field', the Dookits and Shiplaw are not discussed in this review (see **App.2**).

1.2.1: Broughton Heights, screes

NT 114407, ID: 3 (code for Figures 23-25)
N=2, KNX774-5 (my catalogue numbers)
Period: unk.
Two undiagnostic cherts from chert screes on steep hill slopes.

1.2.2: Cavalry Park, Peebles

NT 26353975, ID: 35
N=146, KNX 501-642, KNX720
Period: unknown, includes mesolithic
146 artefacts, two flakes of slag and three body sherds of pottery were collected from spoil heaps after topsoil was stripped from Cavalry Park prior to building works (Knox 1994). Two pieces of pot are prehistoric ceramic: one of a well fired tan-orange fabric with a quartz and grit temper, one is a highly abraded sherd of a coil built pot with a slightly polished tan-pink exterior, with black interior, again with quartz and grit temper but less evenly fired. The final ceramic is a base fragment of a heavily glazed late/post medieval type. A 'sponge finger stone', possibly of early bronze age date, was also recovered (Sheridan 1995).

The lithics were dominated by a very dark grey-blue chert (n=141, 96.6%). Some of this chert was clearly derived from secondary sources, its exterior rolled and battered. On other pieces the origin of the material was hard to ascertain. Some of this chert was of high quality. Occasional fragments of a light blue chert are present, along with some distinctive lustrous pieces. Red coloration to the cortex is noted on some pieces, this along with the lustre, may indicate some form of heat treatment. Small amounts of grey and dark grey (n=4) flint and one quartz flake comprise the rest of the collection. The majority of the flint is unusual in character, for example *KNX0576*,[1] a battered, rolled, partly cortical fragment of very dark grey, high quality flint.

The collection includes a high number of bashed lumps and large flakes and, in general, includes large amounts of production waste, crude flakes and the like (Figure 199). Cores are very frequent and a range of types is present (Figure 198). These include formal blade cores (*KNX0531*, *0545*, *0569*, *0614*, *0638*) as well as slightly more irregular examples (*KNX0623*, *0612*) and bashed lumps and chunks. Some cores demonstrate severe problems with hinging, and other fragments such as *KNX0535* show the variable quality of the material. The cores vary quite widely in size, and it is hard to assess the reason for their deposition. Much material ranges between cores and bashed lumps, and there is little differentiation in size between these types; although the more formal cores do tend to be slightly smaller than bashed lumps (Figure 200). There are numbers of large, exterior flakes and in general it appears that a lot of preliminary testing of material, some of which may have been riverine, was taking place on the site.

Notwithstanding the importance of preliminary testing of material careful platform preparation and use of indirect percussion was significant at Cavalry Park (Figure 201). Blades and regular flakes have a much higher proportion of complex preparation expended on

[1] Throughout these appendices text in italics refers to catalogued lithics, text in bold refers to contexts.

their manufacture and their platform sizes are much smaller. In fact, the few regular and irregular flakes with very small platforms may result from flawed blade production, and in this case the use of a different reduction technique for the many large or irregular flakes may be indicated.

A total seven (4.8%) retouched and five (3.4%) possibly retouched artefacts were in the assemblage (Figure 197). Two of these were microliths, one fragmentary light grey flint backed bladelet (*KNX0505*) and one narrow blade obliquely blunted piece (*KNX0595*) as well as one possible microburin (*KNX0605*). A range of convex scrapers are present: (*KNX0606*) a light grey flint short thick scraper with cortical backing, without a perfect convex edge; *KNX0558* a dark grey chert short thick cortical scraper, with a slightly irregular series of straight edges. Less formal scrapers are also present, *e.g. KNX0562*, an irregular large flake, with a few further removals and small area of blunting retouch at the distal. A few more irregular pieces, with possible retouch or edge damage are present, but these are of little diagnostic value.

In general most of the assemblage is congruent with a mesolithic date. Some mixing seems likely and, as with any surface collection it is difficult to assess the extent of reoccupation or palimpsest. The relationship of the assemblage to the prehistoric ceramic is unknown. This is not a typical mesolithic site, far too many pieces are fragmentary but its affinities are with those industries and it may be that many finished pieces have been removed from here during prehistory. In particular the low numbers of blades relative to cores is suggestive. Perhaps a source of fair quality water rolled chert was utilised at this location, providing a pull for local occupation.

1.2.3: Chapman's Well, Innerleithen

NT 327369
N=4, KNX837-840
Period: unknown
Irregular flakes and chunks of dark blue chert found in molehills on north facing slopes of Caerlee hill, 27/4/89.

1.2.4: Clashpock Rig

NT 132408, ID: 4
N=11, KNX920-929, 1301
Period: unknown, includes mesolithic?
Eleven artefacts from the eroding face of chert-rich (?)Lateglacial terraces above a Hopehead Burn at Clashpock Rig are in the Knox collections and more flakes (non-diagnostic) have been observed in the field (1998) (see also Knox *et al.* 1989). The flakes are all of chert and, bar *KNX920 & 927*, all of a distinctive dark grey-black chert, some of which is of high quality. *KNX920* is a small, neat single platform pyramid blade core, on mottled grey chert and almost entirely exhausted (16 x 25 x 23mm; Figure 157). There are hints of blade production in some of the broken regular flakes. One retouched artefact, an unusual scraper with a possible graver edge is of interest, being manufactured in a mesolithic style.

Two unusual large artefacts are also worthy of detailed comment. *KNX929* is a large flake of dark grey chert (137 x 48 x 20mm; Figure 157). It is struck with a facetted platform, and the edges of the artefact are edge damaged and, in places have small areas of blunting retouch. The affinities of the artefact are hard to gauge and it is impossible to date. It is remarkable in itself for the size of the piece, especially given the range of chert available in the Borders. It has some associations with ards, or crude digging implements and it is tempting to suggest that it was used to hack into the terraces in order to obtain chert, although this seems a poor use for such a large flake. *KNX1301* is large secondary chunk of dark grey chert (72 x 53 x

30mm), again edge damaged. This appears to be a simple bashed lump, but its size, and relatively high quality is interesting.

It is impossible to definitively associate the artefacts in this small collection together. They certainly indicate prehistoric exploitation of the chert sources at Clashpock Rig, seemingly from the mesolithic or early neolithic. The presence of enigmatic large tools is of interest but does not allow interpretation.

1.2.5: Crookston Burn, The Cut

NT 254386, ID: 31
N=1, KNX0879
Period: mesolithic
One blue chert retouched bulbar blade (Figure 324). Small patches of blunting to one side and partial truncation. Unclassifiable microlith found on path by the burn. According to the farmer the low ground here was still a small loch recently.

1.2.6: Drove Road

NT 277366, ID: 42
N=13 KNX882-894
Period: unknown
This collection of material from *c.* 420m OD is comprised entirely of a distinctive grey-blue chert, much of which (n=5, 38.5%) is 'patinating' to a pale grey. A pale cream cortex is present of many pieces and some of this is quite fresh: it is hard to assess the source for this material. The small cluster, found in an erosive context on a high footpath on a peat-covered hilltop to the south of Peebles, includes three chunks, nine irregular flakes and a regular flake. Much of the débitage is quite small (six artefacts are <15mm in maximum direction). Two possible scrapers are present, *KNX892* is a small flake (22 x 15 x 7mm) with a very square distal end which has small, irregular removals across it, it may be an end scraper but it is not a very formal tool. *KNX0884* is a large irregular flake (46 x 41 x 15mm) with an irregular notch and other possible areas of faint retouch. It may be a concave scraper but again, it is not formally very distinctive. The Drove Road material is of great interest for demonstrating prehistoric lithic activity so high up in hills, but is, unfortunately, non diagnostic.

1.2.7: Eddleston

NT 245471
N=4, KNX0766-0769
Period: unknown
Undiagnostic flakes and irregular retouched flakes from molehills on slopes of Temple Hill, found 15/3/86. Use of very light blue chert suggests a localised source. Eddleston is also discussed by Mulholland (1970) although it is not clear that these are the same sites.

1.2.8: Edston Hill

NT 22604140, ID: 17
N=9, KNX1337-1345
Period: unknown
Nine irregular flakes and chunks of varied Southern Uplands chert. Undiagnostic collection from molehills in flattish ground on the bottom of the valley of the small burn draining through Edston Farm.

1.2.9: Ferniehaugh

NT 267398, ID: 38
N=71, KNX649-719
Period: unknown, meso-neo?

This large collection comes from a ploughed field on the south banks of the Tweed. The assemblage is dominated by a dark-grey/grey chert (n=64, 90.1%) sometimes clearly derived from rolled sources (*KNX695*, *696*). The quality of the chert is varied, but it can be high. Four flint artefacts are present; including high quality mottled black flint (*KNX0651*), and red flint (*KNX0668*). These latter, and a pitchstone proximal bladelet fragment (*KNX0719*), are testimony to non-local raw material sources. Two agate pebbles are also present, one is probably natural (*KNX714*), and the other has an irregular flake removal (*KNX690*).

Although regular flakes and (to a lesser extent) blades are an important part of this assemblage it is irregular flakes and chunks that dominate (Figure 206). Cores and bashed lumps are also significant. Two formal blade cores are present (*KNX0652*, *0707*), and these are both of good quality grey chert, the former is not from a rolled source. However many of the other cores are quite irregular, and merge into the category of bashed lumps. Many of the cores are quite large. *KNX609* is a clear example of bipolar reuse of an exhausted blade core or rejuvenation tablet. There are many large or chunky primary and secondary flakes as well as smaller debris. Some flakes are clearly overshot or may have been useful rejuvenation strikes. Evidence of platform preparation is inconclusive but some simple preparation was clearly taking place

There are seven retouched artefacts in the assemblage (Figure 205). Many of these retouched artefacts are not formally diagnostic and have short patches of rather irregular blunting retouch (*KNX655*, *670*). Concave scrapers are well represented (*KNX684*, *688*). *KNX650* is a broken, unidentifiable artefact with neat microlithic trimming. *KNX651* is a heavily prepared flake of mottled dark grey flint, with a small area of invasive retouch on a naturally backed angle.

Despite the lack of formal typological comparisons the technology appears to mesolithic or early neolithic in broad affinities. At a crude level the assemblage is comparable to that from Cavalry Park, dominated by crude production waste, testing of cores and the removal of artefacts. It is therefore interesting that the site includes exotic raw materials, not noted at Cavalry Park.

1.2.10: Field, near Woodend, east of Peebles

NT 309379
N=2. KNX647-648
Period: Unknown
Undiagnostic regular flakes of dark chert from ploughed field adjacent to Tweed.

1.2.11: Flint Hill

NT 136407, ID: 5
N=3, KNX847-849
Period: unknown
Two irregular flakes and a blade of dark blue-grey chert from the paths beneath the quarry pits at Flint Hill (Figures 159-163; Cowie *et al.* 1986a).

1.2.12: Goseland Hill

NT 079345
N=11, KNX 901-911
Period: Unknown
Nine artefacts of dark grey and two pieces of grey-blue chert were recovered from Goseland hill at *c.* 250-300m, from in and around natural outcrops and screes of chert. It is possible that these artefacts have been redeposited from the steep slopes above the Kilbucho Burn. Most of the artefacts are poor chunks or irregular flakes, and many are suffering from extensive edge damage. This makes the identification of retouch very difficult but two pieces, *KNX904* and

KNX909, both fragmentary, may have been retouched into scrapers, although neither are morphologically distinctive. Most of the dark grey chert is low quality, with a clear tendency to split in a planar fashion and it is possible, especially given their damaged state, that some of these crude artefacts are not anthropogenic. *KNX903* however is a notably different artefact than the other pieces, a flake of higher quality light blue-grey chert, clearly indicating knapping activity.

1.2.13: Gypsey Glen

NT 262390, ID: 33
N=4, KNX770-773
Period: unknown
Non-diagnostic assemblage found 26/12/84 on footpath from terrace above confluence of Haystoun Burn and Crookston Burn includes one flint flake and an interesting chalcedony flake.

1.2.14: Hollows Burn, 'Field boundary'

NT 117379, ID: 1
N=2, KNX857-858
Period: Unknown
Undiagnostic flake and chunk of blue-black chert found in animal scrape in turf field boundary near top of hill (*c.* 350m OD).

1.2.15: Hope Burn, Kilbucho

NT **060332**
N=9, KNX 870-878
Period: unknown includes mesolithic?
A small assemblage of nine artefacts of grey-blue, dark grey and grey chert artefacts recovered 30/6/90 from *c.* 350-370m OD in chert screes low in a steep north facing valley leading away from Cardon Hill. The collection includes two regular flakes, two irregular flakes, two chunks, two cores and a bashed lump. One of the cores (*KNX0870*) is a neat cylindrical exhausted bladelet core of classically mesolithic type (24 x 20 x 17mm). Two artefacts may have been retouched, *KNX0872* is a large flake with a large faintly retouched notch, and it is possibly a concave scraper although rather irregular in form (29 x 27 x 10mm). *KNX0877* is an irregular, multi-directional core with small areas of edge modification, which may be retouch or crude platform preparation (35 x 24 x 12mm). Although the assemblage is small, the presence of clearly different types of chert and a fine blade core may be an indication that the scatter from Hope Burn is evidence of some kind of early prehistoric use of these upland areas.

1.2.16: Ingraston Sand Quarry

NT 115485
N=228, KNX1064-1283, 1317-1324
Period: mixed, inc mesolithic
There are a total of 228 artefacts in the collection from Ingraston Sand Quarry. More artefacts from Ingraston are held in the Peebles Museum, along with some material from the sites at Manor Bridge. Unfortunately this material appears to have become mixed, and is therefore of minimal analytical use. It is excluded from this discussion.

Chert is the dominant raw material present at Ingraston (n=131, 57.4%) but flint is very significant (n=89, 39%). The chert varies a lot in colour; blue-grey (n=33) and grey-blue (n=38) pieces are common but dark blue-grey examples (n=15) and dark grey (n=5) or black cherts (n=7) are also present in significant numbers. Some, at least, of the cherts are struck from water rolled pebbles. The flint present is mainly grey pebble flint, merging into honey-greys. The source of this material is not known: some of it has a chalky cortex (*i.e.*

KNX1257). One distinctive mottled pink-honey flake is of interest. It is not a material commonly seen in the area and Knox reports that it is also known from Melbourne.[2] The presence of pitchstone is testimony to some external links. 32.8% of the chert present includes cortex or exterior surfaces, as opposed to only 14.6% of the flint. Flint is also much more likely to be tertiary than is chert. Overall the assemblage is dominated by flakes, both irregular (n=91, 39.9%) and regular (n=79, 34.6%) (Figure 326). Regular flakes are more common on flint than they are on chert.

A few blades, mainly manufactured on chert, are present and there are surprisingly few chunks at Ingraston. Bipolar cores are quite well represented, forming 5.3% of the artefacts present; interestingly these are more common than more formal cores, and are present on flint and chert in equal numbers. There is a wide variety of percussive evidence from the site; including punch percussion as well as birds wing platforms (*KNX1116*). There is also one fine hammerstone in the collection, a slightly oval water rolled pebble (80 x 49 x 36mm) with clear use-damage at one end.

Retouched artefacts are quite common (Figure 325). Twenty-seven artefacts are definitely retouched, and three are possibly retouched. These range greatly in morphology and affiliation. Flint is over-represented on definitely retouched pieces, sixteen (59.3%) of which are flint. All of the possibly retouched artefacts are flint. The variety of retouched artefacts is impressive: two geometric chert microliths (*KNX1320*, *1200* both irregular scalene triangle/crescents), two irregular flint burins/gravers (*KNX1228*, *1256*), notched pieces (*KNX1174*, *1249*) as well as many irregular, and unclassifiable pieces. Six scrapers are present, ranging quite widely in size as well as one burnt, abraded possible scraper, possibly a strike-a-light (*KNX1188*). All of the scrapers have convex scraping edges, and vary slightly in morphology, from small circular examples (*KNX1104*) to more flared 'duck bill' types (*KNX1225*, *1171*). One interesting group of artefacts is four large sub-triangular/crescent honey-grey flint flakes with irregular nibbling retouch initiated from both sides of the artefact (Figure 325). The location of this retouch varies but all the artefacts have an effective point. They are all longitudinally broken (*KNX1072*, *1175*, *1202*, *1232*). These are unusual artefacts, without direct parallels, but may be mesolithic.

The assemblage from Ingraston is very interesting, not least because of the unusual combinations of raw material on site, especially the use of flint. As a whole there are few local parallels for the assemblage, which seems likely to be mixed, the variations in reduction technology certainly seem to suggest this. The site clearly includes mesolithic artefacts, both geometric microliths and more unusual triangles.

1.2.17: Jedderfield

NT 242407, ID: 29
N=25, KNX1325-1349
Period: unknown blade core industry

Crude waste and cores (Figures 327-328) dominate the small assemblage of twenty-five pieces found 25/4/97 from a ploughed field at Jedderfield, on slopes to the north of the Tweed. The assemblage as a whole is very fragmentary and edge damage is notable on many pieces. Most of it is, strictly speaking, non-diagnostic although the presence of a number of characteristic blade cores on small triangle pebbles is suggestive of early prehistoric activity. Most of the material is rather crude and river worn pebbles are an important part of the industry. The most notable exception is *KNX1336*, a fragmentary very fine convex (thumbnail) scraper that may be later prehistoric in date.

[2] NMAS ref AB2681

1.2.18: Kilrubie Hill

NT 216470
n=6, KNX0724-0729
Period: unknown

Light blue chert, undiagnostic waste material from animal scrapes at chert quarry site (Knox & McKean 1993a).

1.2.19: Kingsmeadows

NT 263395. ID: 34
N=10, KNX 1291-1300
Period: unknown

A total of ten artefacts were recovered from Kingsmeadows (also identified as Building Site, Whitehaugh 96/97). These included two regular flint flakes and eight flakes (six irregular, two regular) of blue-grey chert, much of which appears to derive from one particular source. The material is not diagnostic. The site is immediately adjacent to Cavalry Park and the material was also recovered from topsoil spoil heaps and just above the subsoil. The two sites may be continuous.

1.2.20: Kingsmuir

NT 253393, ID: 30
N=73, KNX0733-0759, 0779-0824
Period: unknown, neolithic?

A total of sevety-three artefacts were recovered from a ploughed field on high ground overlooking the Crookston Burn, south of the Tweed at Kingsmuir (also identified as Field, Bonnington Farm 1990). Fifty-seven (78.1%) were chert, ranging from dark grey, grey, grey-blue to blue-grey in colour. Much of this chert appears to have been from a secondary and rolled source, but the chert still varies greatly in quality. Eight (11%) flints are present. These are mainly grey but a large (48/25/5mm) retouched regular flake of honey-orange tertiary flint is very notable. Four pieces of Arran pitchstone are present (Figure 209), including blades, flakes and chunks and it is likely that this was being knapped *in situ*. Four agates finish the collection, one of these is a natural pebble, but the other three have been crudely worked.

Regular flakes and to a much lesser extent, blades form an important part of this collection which also has a significant component of irregular flakes and chunks (Figure 203). Cores and bashed lumps are rare, the presence of a bipolar core (*KNX823*) is notable. *KNX821* is a very small two-platform blade and flake core on high quality chert (25 x 24 x 15mm) and has mesolithic or early neolithic affinities. *KNX757* is a very thin irregular disc core, almost bipolar. Despite the poor representation of cores at the site the large amounts of small débitage and waste indicate that knapping was taking place. That this was careful and structured is clearly evidenced by examining platform preparation (Figure 204) which was clearly preferentially expended upon flint artefacts, especially facetted platforms (*KNX734*, 745), and on blades and regular flakes. An examination of the size of the platforms also suggests that wide platform flakes were important (these are often faceted), alongside those presumably resulting from point percussion aimed at blade production. Interestingly this pattern is not affected by raw material differences. One core rejuvenation flake, carefully removing the platform edge of a core is also present (*KNX786*).

A total of fourteen retouched artefacts were recovered from Kingsmuir (Figure 202). Four of these are of flint, which is over-represented in this category. The retouched objects ranged widely in type, from formally retouched pieces such as *KNX743*, a chunky, incomplete bifacially retouched implement, possibly a leaf shaped arrowhead (21 x 16 x 9mm) and concave scrapers (KNX 824) a large chunk (52 x 31 x 17mm) with two clear notches, one inverse. Some patterns can be identified: three proximal fragments of flint blades/regular flakes with distinctive platform preparation all have small areas of retouch on one side of the fragment. There is no evidence that these pieces are microburins. *KNX752* and *KNX756* are also similar, chunky thick scrapers with light retouch, KNX752 has a slightly convex, almost straight edge whilst *KNX756* has a light, convex edge as well as a large concave area of extensive stepped micro-scars. *KNX733* is a large, fine blade of honey flint with rather irregular retouch extending along one side forming, in one place, a slight notch. A range of less regular retouched artefacts is also present. Some at least of these are also extensively edge damaged. The affinities of these artefacts are hard to assess, although some (the projectile point and the larger scrapers) may be neolithic.

Although there are clear similarities with other sites in the area, for example in the use of local chert sources and the presence of a small amount of blade technology, there are also differences with many of the sites that I argue to be mesolithic. This is notable in the use of exotic raw materials, particularly Arran pitchstone which appears to have been knapped *in situ* and also in the production of regular flakes with large platforms. Blades are also only a small part of this collection that combines a range of artefact types, although cores are significantly under-represented. It may be some kind of neolithic occupation site, with cores being removed.

1.2.21: Kittlegairy Hill

NT 275417, ID: 41
N=3, KNX0833-0835
Period: unknown, includes mesolithic
One flint microlith. Broken isosceles triangle (18 x 11 x 2mm, *KNX0833*. Figure 324). One flint chunk, one chert regular flake. Mesolithic activity but relationship of microlith to other pieces is not clear. Recovered from mole hills on steep slopes above Soonhope Burn 12/3/88.

1.2.22: Kittlegairy 2

NT 273416, ID: 42
N=6, KNX 1284-1290
Period Unk.
A collection of six artefacts recovered from the slopes of Kittlegairy Hill in forestry plough furrows included two burnt flint flakes, two regular chert flakes, an irregular chert flake and a chunk of chert as well as a lump of burnt bone. The assemblage cannot be dated.

1.2.23: Leithen Water, Forest Road

NT 279463
N=2, KNX0844-0845
Period: unknown
Two irregular flakes, one very large, of chert found on a forest road on valley floor of infant Leithen Water, high in the hills.

1.2.24: Manor Bridge, N river/W road: 'Plantation'

NT 228396, ID: 19
N=45, KNX 275-318, 644
Period: unknown, possibly mesolithic?
Forty-five artefacts were collected from the plough soil on low ridges above the Tweed in an area now planted with conifers over the road from the main site at Manor Bridge 'cow field'. Thirty-nine (86.7%) are chert, ranging very widely in colour and quality. A range of water rolled pebbles were clearly utilised (*KNX298*, *292*) and primary flakes and chunks from this material are an important part of the assemblage. A higher quality blue chert is also present, this has a rougher cortex and its source is not known but it may be quarried (*KNX279*, *315*). Finally, a very high quality black chert is present, some of which is slightly rolled (*KNX644*)

but some may have been quarried (*KNX299*). Two grey flints, two agates, a quartz and a thin, blade like fragment of greywacke complete the assemblage.

The collection includes large amounts of production material; cores, bashed lumps and chunks (Figure 263). Regular flakes and a few blades complete the assemblage. The cores vary widely in type, from irregular bashed lumps, almost bipolar in technique (*KNX279*), unusual blade cores (*KNX299*) to small formal blade/flake platform cores (*KNX273, 275, 285*). These cores are small, and sometimes have two platforms. Primary material is dominated by water rolled or cruder cherts and probably reflects the preliminary preparation of material. Some blades and regular flakes are present, and these sometimes demonstrate simple platform preparation. Platforms are also quite small in general. There are 4 retouched artefacts in the assemblage (Figure 262). These include a small, chunky, steep thumbnail scraper on purple-blue chert (*KNX286*, 17 x 17 x 11mm), a type that has close parallels at the Dookits, and a partially edge-blunted flake (*KNX283*). *KNX281* is an unusual scraper-type tool, with one neat straight scraper edge and on the other side crude bifacial removals.

The affinities of the industry, and its homogeneity are far from clear, but in general, being dominated by blade and small flake production, it appears to fit in with the well documented mesolithic occupation of the area. Topographically the site is continuous with Manor Bridge and the assemblage has many similarities to this site, notably in its use of chert (*c.* 84%) and in the importance of blades and flakes. However the importance of testing of riverine material is not closely paralleled at Manor.

1.2.25: Manor Bridge, S river/E road

NT 231398, ID: 23
N=7 KNX 322-328
Period: unknown, mesolithic?

Six artefacts and one pebble were recovered from molehills and animal scrapes amongst a rocky area of the present day flood plain of the Tweed opposite the Popples. The objects are fresh and do not appear to have been redeposited by water. They include five cherts, ranging from green-blue to dark grey, and one grey tertiary flint. Three narrow blades are present, all fragmentary and none are retouched, these were manufactured on the flint and the finer quality cherts. Two irregular flakes and a small chunk complete this small assemblage, which has mesolithic affinities.

1.2.26: Manor Bridge, S river/W road: 'Bellanrig'

NT 228394, ID: 18
N=30, KNX329-354
Period: unknown includes mesolithic

The thirty artefacts from Bellanrig are a small and probably mixed collection, recovered from plough soils and molehills on top of a river terrace above the modern floodplain of the Tweed overlooking the junction of the Tweed and Manor. Seven of the artefacts (23.3%) are grey flint, one is a very fine dark grey flint, possibly heat-treated (*KNX338*). Two burnt flint chunks are present. The remainder is chert of varying shades of blue-grey including some high quality black/dark grey material. Some, at least, of this chert is clearly derived from rolled pebble sources (*KNX329 & 330*, primary flakes with rolled non-cortical exterior). The material includes chunks, flakes and blades as well as retouched tools. One rather irregular, single platform blade/flake core is present.

Three retouched artefacts are present (Figure 324). These include a small fragmentary microlith, possibly a backed bladelet/rod, manufactured on grey flint (*KNX353*, 9 x 4 x 2mm), and a regular flake of chert, possibly broken, with a clear inverse proximal notch on the right hand side (*KNX0333*). *KNX338* is an enigmatic artefact, a fragment of a complex retouched flake of high quality, possibly heat-treated dark grey flint with a very rounded cross section.

One side has extensive scraper retouch, whilst the distal has clear notches. The artefact is not diagnostic, but does not appear to be mesolithic.

The assemblage contains mesolithic artefacts, both in terms of retouched tools and blades. There appears to be some later material included, and the extent of mixing is hard to assess but in general the collection from Bellanrig further confirms the density of mesolithic activity in the upper Tweed, especially at the Manor/Tweed junction

1.2.27: Merrybrae Enclosure

NT 315373

N=10, KNX0492-0500, 0645

Period: unk.

These ten artefacts include one natural sandstone pebble, a fragment of a pitchstone blade, one large patinating flint flake and a small range of chert artefacts. These include a fine multi-platform fragmentary blade core (*KNX493*), and three fragments of blades or regular flakes. Of these *KNX499* has very light discontinuous edge blunting although it is unclear whether or not this derives from edge damage or retouch, edge damage is common in this assemblage. The site is from a terrace just above the Tweed and was discovered in plough soil. Down-slope, a distal fragment of a very fine convex end of blade scraper was discovered at NT314371.

1.2.28: Neidpath Haugh, north Bank

NT 237404, ID: 25

N=37, KNX 0355-0389, 0643

Period: includes meso?

The small collection of thirty-seven artefacts from molehills and the footpath on the lowest terrace above the Tweed at Neidpath is dominated by chert (n=33). As well as blue-grey material other interesting cherts are present including a jet-black, lustrous chert (*KNX0361 & 0355*) and purple and brown examples. Only three small fragments of flint are present, including honey and grey material. The collection includes a lot of knapping debris as well as the abraded, broken remains of a formal blade core (*KNX0371*). One very small blade core is also present (*KNX387*, 15 x 17 x 10mm). Cortex or exterior flakes are rare, but where present is congruent with derived pebble sources for this material. The bulk of the collection is fresh, suggesting that it is *in situ*, but a few (?)water rolled objects are present, and their association with this scatter may be fortuitous.

Blades are an important component of an assemblage dominated by chunks and irregular flakes. Platform preparation is over-represented on blades and regular flakes, and platforms are generally small, coherent with the use of point/indirect percussion. Only 2 retouched artefacts are present; *KNX0358* is a fragment of a large backed blade (Figure 324), a chunky, attractive blade with an acute cutting edge backed by a partly cortical fragment of the blade and an area of blunting retouch. *KNX0370* is a fine convex scraper manufactured on the side of a chunky regular flake of blue-grey chert. A thinning flake has been removed from its ventral surface. *KNX384* is a rolled chunk of blue-grey chert with a clear notch removed. It is unfortunately impossible to definitely state whether this notch is deliberate.

It is hard to say anything conclusive about the Neidpath material. The collection displays affinities with mesolithic sites in the region, particularly in its raw material use and the presence of blades and backed blades (although the Neidpath example is very large). However the location of the scatter on the lowest terrace of the Tweed and the inclusion of some clearly secondary material suggests that some caution about this scatter might be urged. The rocky outcrop on which the Castle sits above the haugh, is however, an ideal site for mesolithic settlement, and some of the material may be derived from this location.

1.2.29: North/South Knowe

NT 265436, ID: 37
N=2, KNX0867-868
Period: unknown

Large convex chert scraper with invasive retouch on chunky tablet flake. Probably later prehistoric, from molehills in depression between North and South Knowe, high ground, overlooking Soonhope Burn, 5/12/90.

1.2.30: Parkgatestone Hill, platforms

NT 089356
N=8, KNX0825-0832
Period: unknown

Four regular flakes, sometimes large, three chunks, and irregular flake core, all of dark blue-grey chert from natural(?) platforms at chert outcrops.

1.2.31: Path to golf course

NT 240407, ID: 28
N=2, KNX0896-897
Period: unknown

Two bashed lumps of chert with crude flake removals found 31/7/89 on path on terrace overlooking Tweed uphill of Jedderfield (**App.1.2.17**).

1.2.32: Portmore Loch, Eastside

NT 261506
N=6 KNX 851-856
Period: unknown

Six artefacts were recovered from *c.* 320m OD on gravel on sloping beach at Portmore Loch. These include one very fine regular tertiary flake of high quality green chert with a large platform (*KNX851*). *KNX852* and *854* are bipolar cores, *852* is of very low quality chert. *KNX853* is a slightly more regular core, with a few flake removals taken across one face of a large chunk (non water rolled) of black chert (37 x 51 x 17mm). The other artefacts are chunks. The assemblage is an indication of prehistoric activity in an area near outcropping chert, but cannot provide a date for that activity.

1.2.33: South Park Wood

NT 237403m, ID: 24
N=7, KNX 390-396
Period: Unknown, earlier?

This small collection of seven chert artefacts from path on the south bank of Tweed opposite Neidpath Castle includes two pebbles, two bashed lumps/chunks, an irregular core and two fragmentary blades. Most of the material is a coarse dark grey-blue chert, although a much higher grade material has been used for the large blade/regular flake *KNX391*. Two artefacts are possibly retouched, although they are also extensively edge damaged. Of these *KNX391* is a broad secondary blade, with very light regular scars along one side. *KNX393* is very fragmentary and damaged but appears to be a distal blade portion with blunting retouch forming a tang. Both artefacts, although strictly non-diagnostic have earlier-prehistoric affiliations.

1.2.34: Stevenson Burn

NT 173443, ID: 9
N=8, KNX912-919
Period: unknown

Eight artefacts were collected from chert screes at Stevenson Burn on southwest facing slopes at *c.* 400m OD. The site may be a continuation of activity from Wide Hope Shank. These are all of grey or blue grey chert, some of which is not very weathered. As well as irregular flakes and chunks there are three retouched artefacts, and it seems likely that this high proportion is a product of collection. *KNX912* is a lightly rolled medium chunky flake (26 x 22 x 10mm) of dark grey chert with fresh cortex at the distal. Regular blunting retouch extends around most of the artefact, which is also slightly edge damaged. The artefact is apparently some kind of scraper. *KNX913* is a secondary flake with a distinct longitudinal curvature, it has a clear notch in the extreme distal making a neat, ergonomic concave scraper (31 x 26 x 13mm). *KNX915* is a large convex side scraper (58 x 39 x 15mm) manufactured on a chunk.

1.2.35: Stobohope Head

NT 139401, ID: 6
N=22, KNX859-866, KNX1302-1316
Period: unknown, ?meso

A total of twenty-two cherts and two pieces of later prehistoric ceramic are known from mole hills at Stobohope Head, high in the hills near Flint Hill and Clashpock Rig. The chert varies in type and quality, but is often dark blue-grey, or blue grey. Three cores are present. One (*KNX1315*) is a small pebble of green-grey chert with a weakly developed platform and flake/blade removals. A fragmentary platform core (*KNX861*) and an irregular chunk with irregular blade/flake removals (*KNX1316*) are similar. Two fine broad blades are present (12 mm, 14 mm in width), both have evidence of platform preparation and punch percussion, they are also edge damaged. Finally a retouched regular flake of high quality chert may also indicate early prehistoric activity. It is leaf shaped and has nibbled edge blunting all around it, its dorsal surface shows clear blade removals. The rest of the material is comprised of chunks and irregular flakes, sometimes very small, and evidence of *in situ* knapping. Assessing the date of these assemblages is difficult. A stress on blade production is not solely a mesolithic trait, and without further evidence it is hard to establish whether or not these artefacts are mesolithic or earlier neolithic. The ceramic is presumably intrusive.

1.2.36: Upper Newby

NT 265372, ID: 36
N=3, KNX0761-763
Period: Unknown

Two chunks and one regular flake of dark grey, dark grey-blue chert from molehills on sloping ground near Whitelaw Burn, 16/1/88.

1.2.37: Whitelawburn

NT 230479
N=3, KNX730-732
Period: unknown

Undiagnostic irregular flakes and bashed lump (Knox & McKean 1993b).

1.2.38: Wide Hope Shank,

NT 189449, ID: 12
N=134, KNX0930-1063
Period: unknown

A total of 134 artefacts from Wide Hope Shank, found in animal scrapes and molehills in association with chert quarry pits (Figures 170-196, **App. 2.6**), are in the Knox collections (Knox & Finlayson 1989). All of these artefacts are chert. Most of this is blue-grey in colour but some blue homogenous material is also present in small quantities. Some brown chert is present. This is of lower quality, and breaks in a planar fashion (many flakes have triangular sections). In places this chert has slightly rounded dorsal surfaces. This may be from the interface of chert and shale. A number of bashed lumps and failed removals clearly demonstrate the highly variable character of the chert from this source.

The collection is dominated by production debris (Figure 329); 85% of the artefacts are chunks or irregular flakes. Many of these chunks are very irregular and they are very variable in quality. Although only 3 artefacts were clearly burnt, a number of pieces show hints of heat treatment. Cores included a possible bipolar example (*KNX995*), a range of informal examples and more formal flake/blade cores, these were often small multi-platform examples (*KNX0933*, *940*, *1039*). Seven regular flakes are present as well as an overshot blade (*KNX949*) and one distal fragment of a narrow blade (*KNX0950*).

There are two retouched artefacts and one artefact that may be retouched. The latter (*KNX992*) is a very small flake with a rounded, possibly blunted end. It may be some kind of scraper. *KNX1054* is another small fragment with retouch on a natural nose - it is not morphologically distinctive. *KNX1004* is possibly a scraper, a naturally chunky flake with small areas of retouch on a convex edge.

Dating this assemblage is difficult in the absence of typological referents but an early prehistoric association might be advanced on the basis of the regular flakes and blades and the affinities of the cores with these reduction aims.

1.2.39: Wood Hill

NT 167440, ID: 8
N= 15, KNX0776-778, 1325-1336
Period: unknown

Crude knapping debris of grey blue and dark grey chert. Undiagnostic. Located on chert outcrop (Knox 1989b).

Appendix 2: The Tweed Valley Survey

This document outlines the results of varied small-scale fieldwork and surveys carried out in the upper Tweed Valley as part of this research.

2.1: Excavations at the Dookits

This document outlines the results of small-scale excavations and analyses of surface collections from the Dookits, Hay Lodge Park, near Peebles, Scottish Borders (NT240404). A total of 150 artefacts of mesolithic date have been examined and despite the small size of this sample, and the absence of archaeological features, the site is of some interest in terms of regional settlement.

2.1.1: Background

The Dookits is a small area of outcropping greywacke immediately downstream of the Neidpath Gorge, approximately 1km downstream of the large rock outcrop at Neidpath Castle (Figure 251; Figure 22 for regional landscape). The outcrop lies directly above the water on the north bank and above a large pool, now very popular for swimming (Figure 252). Behind the outcrop steep slopes rise towards the modern A72, whilst the small Rae Burn runs to the immediate east of the outcrop. The area is covered in dense vegetation and is a popular spot for modern fires. The outcrop is cut by a popular footpath that runs through Hay Lodge Park along the north bank of the Tweed to Manor Bridge. In this erosive context Mr Knox recovered 107 artefacts over many years (Cowie *et al.* 1986c). Small-scale test pits were excavated in order to further assess these industries and ascertain the survival of archaeological features. Only a small area of the outcrop was available for excavation due to the extent of vegetation cover, and the pits DK1-4 cluster to the southwest. DK5 was placed at the base of the slope that rose away from this platform. Plans to excavate further pits in this area to explore soil movement were curtailed due to weather conditions in the final week of excavation.

2.1.2: Methodology

Excavations were carried out between the 27th and 30th of July 1998. Five 1 x 0.5m test pits were excavated by hand in *c.* 5cm spits. All spoil was sieved with a 5mm mesh. Finds were recorded by approximate vertical depth. All pits were excavated until clean subsoil was identified. For each pit a complete soil profile was recorded (Figure 254). Photographs were routinely taken of soil profiles and any visible features.

2.1.3: Results

No archaeological features were identified in any test pit excavated. Artefacts were found in all pits, but only in quantity in DK1 (Figure 253). In all pits a highly disturbed soil profile (Figure 254) was observed with root and (presumably) animal action very significant. Burnt lenses with coins, ring pulls, tent pegs were found throughout upper layers (**DK101**, **DK202**). In three test pits bedrock was identified very close to the surface (**DK203**, **303**, **404**; Figure 255). In all cases this was weathered and overlain by varied fine sand deposits; sometimes with lenses of yellow material low down (**DK403**). The sequence in DK1 is more complex. Here no bedrock was identified, but a sequence of sand deposits with differential stone content was observed. At base a weakly blocky orange fine sand with frequent large clasts is presumably a natural soil (**DK105**). This is overlain by fine sand with moderate quantities of sub angular and angular clasts, including some seemingly shattered material (**DK104**). This in turn is overlain by two layers of sand, differentiated only by their clasts (**DK102/3**) and sealed by a deep loam deposit with frequent modern fire settings (**DK101**). Finds were made from throughout **DK103** and above with a few pieces in **DK104**. One interpretation of this sequence is that DK1 was in an area of bedrock hollow that has been filled by a series of soil deposits. Due to its high clast content **DK104** may be a post-glacial deposit later sealed by further sand movement. This would be congruent with the distribution of artefacts in and around this level. In other areas on the outcrop these early layers have not been preserved, possibly because of greater erosion in more exposed areas.

DK5 was abandoned incomplete due to severe rain on the last day of excavation and consequently not recorded to the same standards as the other pits. 25-30cm of silty loam overlay *c.* 7cm of sandy gravel with high frequencies of small, small and medium sub-rounded stones and lots of erratics. At the base of this layer angular material became dominant

2.1.3.1: The lithics

A total of 150 pieces were recovered from excavations and surface collections at the Dookits. Mr Knox had recovered 107 artefacts from erosive contexts and a further forty-three were found during the excavations of test pits in July 1998. Of these 150 artefacts two were natural pebbles and have been discounted from analysis (n=148). The majority of artefacts recovered were fresh although a significant proportion showed signs of burning (n=17, 11.5%). Given the frequency of modern fires, and the extent of disturbance in the area, it is difficult to assess whether this burning is a modern or prehistoric phenomenon. Many artefacts were broken (n=41, 27.7%), and this may reflect the conditions of collection. Although the samples from the Dookits are too small to enable meaningful comparisons, analyses of Mr Knox's larger collections from the Popples demonstrate that his collections are very representative of material recovered from excavations.

The raw materials are dominated by chert (Figure 256), with flint forming a significant proportion, slightly higher than that at Manor Bridge. The colour of chert utilised varied, but was dominated by grey-blues and greys. The flint was predominantly grey in colour and was probably derived from pebble sources.

Regular flakes and blades as well as production waste dominate the collection. Cores are rare. It is very notable that cortical material is very rare at the Dookits and primary material almost entirely absent. There is no meaningful distinction between chert and flint in this sense, and this seems surprising, given the local availability of the former. Despite this, flint and chert were differentially treated by the knappers at the Dookits. Flint was preferentially utilised for the manufacture of blades and regular flakes. Few flint irregular flakes were recorded in comparison to chert although this may reflect the fracture properties of chert. This preferential treatment of flint is paralleled at Manor Bridge.

Only six cores were found at the Dookits. Of these two are broken. Two cores are particularly interesting; *KNX0408* is a fragment of a formal platform blade core, and *DK109* is an interesting flint core, with (flake?) removals initiated from three directions and new platforms and angles of attack removing older platforms. In general however, cores are amorphous and irregular and clearly underrepresented in comparison to regular flakes and blades. Only a small sample of blades exists from the Dookits, and eight of the twelve are broken, making this sample even smaller. Breaks however, are longitudinal, and some information about the width of blades can still be obtained (Figure 257). This small sample suggests that flint blades tend to be slightly larger than chert blades and also suggests a slightly bimodal distribution of chert blades, *c.* 6-7mm and 11-12mm in width. The importance of narrow chert blades is paralleled at Manor Bridge.

Notes were made about platform preparation, platform width and bulb type (Figures 258-60). The extent and character of this could be observed on a total of forty-one pieces. Of these 58.5% had some kind of preparation, often simple isolation of the platform. Platform size tended to be very small, indicating the use of some kind of indirect percussion. There is a hint of bimodality to the distribution, possibly caused by a number of irregular flakes with larger platforms. The character of bulbs of percussion was also noted. Although imprecise this suggests that diffuse and flat bulbs of percussion were common, indicating an absence of direct hard hammer percussion. Diffuse bulbs were common on flint, almost double the average proportion of this raw material. Flat bulbs were more important on chert, and this may reflect the fracture characteristics of this raw material.

A total of twenty artefacts were retouched, and six possibly retouched at the Dookits (Figure 261). Flint is over-represented again here, 26.1% of all flint artefacts are retouched, much higher than the average for chert of 16.3%. The retouched artefacts at the Dookits are interesting, especially in a slight differentiation from the artefacts found at Manor Bridge. At Manor Bridge narrow blade and broad blade microliths were important, alongside a range of end of blade and flake scrapers. In particular very narrow backed blades, scalene triangles and crescents were significant (**App. 2.3**). At the Dookits there are few indications of narrow blade microliths (although narrow blades were manufactured, see above). A range of fragmentary backed, partly backed and truncated broad blades are significant (*KNX0424*, *0431*, *0407*, and *0404*) and two microburins (*KNX0433*, *0461*) are also broad. Scrapers at the Dookits include a range of very small short convex types (*KNX0479*, *0469*, *0422*) measuring only 12 x 11 x 5mm, 15 x 10 x 7mm and 14 x 9 x 7mm. These artefacts are paralleled at Dryburgh Mains and are very distinctive. *DK132* is larger, and is a very fine short thick convex scraper ('thumbnail scraper') with cortical backing. Irregular scrapers are also present, and this includes one very irregular 'core' scraper. One neat burin was identified (*KNX0442*) alongside a series of more fragmentary retouched pieces.

2.1.4: Discussion

The small site at the Dookits is still badly understood and given the scale of collection and excavation it is not possible to interpret the site closely. However it has similarities and differences to other sites in the area. The location on a rocky outcrop is very reminiscent of Manor Bridge and the assemblage is comparable to this site although there are important differences in the types of retouched artefacts.

2.1.5: Acknowledgements

I would like to thank Bob Knox, Poppy Kemp and Ray Wadia for assistance during the excavations.

2.2: Edston 2

This document outlines the results of small-scale fieldwork carried out at Edston Farm, Scottish Borders. A small mesolithic lithic scatter has been identified and is described. The site lies on a gentle ridge in a field above the Tweed (Figures 264-265).

2.2.1: Background

Fieldwalking at Edston2 took place on 10/5/98: the site is so named because it was the second field on the farm to be examined. Weather conditions were good and the field was well weathered. The field was walked at 10m intervals north-south on an arbitrary grid established using the east wall as a baseline. The field was not completed in the day and the last line examined was 310m E. During fieldwalking a small concentration of artefacts was identified at c150/80 (NT21334012) and the area between 130-160m east-west and 70-110m north-south was intensively walked at 2.5m intervals (Figure 266). This completely encompassed the scatter and provided almost total artefact recovery of the area. A total of eightyone artefacts were recovered in total from the field, of which thirty come from the scatter.

Following the identification of this scatter nine test pits were excavated on 22/11/98. The aims of the test pit excavation were to further establish the characteristics of the scatter and to obtain a comparative sample to that gained through fieldwalking. All pits were 1 x 0.5m, aligned with the long axis north-south and the grid reference in the northwest corner of the pit. Sieves of 5mm and 2mm were used, although the damp earth repeatedly blocked these. The pits were laid out on a 'diamond' grid, a 10 x 10m square with a pit placed in the centre. In all test pits the same basic soil profile was recorded, 20-30cm of clay silt plough-soil was clearly differentiated from an eroded till subsoil (yellow-grey gravel clays). Minor variations in drainage were observed. Although conditions were cold and dry the plough soil (clay silt) was very waterlogged. This caused problems with sieving, although the identification of large numbers of small pieces of natural chert suggests that recovery standards were still acceptable. Low numbers of artefacts were found in most pits (Figure 267). One pit (160/80) was abandoned due to standing water at *c.* 15cm depth. Unfortunately, due to technical difficulties, the photographic record of the excavations has been lost.

2.2.2: Chipped Stone

2.2.2.1: Generalised scatter

The generalised background scatter includes forty-eight varied artefacts (Figure 268). These include a large proportion of crude waste, especially in the form of irregular or abandoned cores, but also some fine retouched artefacts. These range from a formalised end of blade scraper with extensive further retouch altering the edge angle to one side, possibly forming a kind of composite tool (*EDST2074*; Figure 269) to crude notches of varied types (*EDST2076*) and burins (*EDST2055*). This suggests a range of dates of occupation, although it should be noted that a lot of the material is congruent with a mesolithic date, notwithstanding exceptions such as the fine end scraper/knife. Chert is the dominant raw material, ranging greatly in type including a variety of rolled pebbles.

2.2.2.2: The scatter

A total of fifty-nine artefacts were found in the small scatter at Edston 2 (Table 270). Of these thirty were recovered during field walking, and twenty-nine from excavation. The scatter is dominated by chert (94.9%). This chert varies greatly in type and in quality but is often small. 46.5% of the chert has traces of the exterior of the source (primary = 3, secondary = 23); this is also varied in type but is often congruent with a pebble source. One natural pebble of flint was recovered (*EDST2033*). This is an unusually shaped small rolled piece with some very crude rolled removals. It is not of a local type and may have been bought to the site at some stage. Finally a single quartz piece is present.

The assemblage itself is unusual in character and with such a small sample it is difficult to say very much about the activities resulting in its generation. In a general sense waste seems to have been significant, as chunks are the most numerous artefact type. However blades and regular flakes are important, as are cores, and especially bipolar cores. Interestingly, 75% of the blades are broken and while this may in part reflect the fragile character of these artefacts it is notable that many are proximal fragments and that in these sometimes closely resemble microburins (Figure 269). One convincing microburin has been identified, *EDST2007*, which has a weak left-hand-side notch and a slightly irregular break as well as two other possible cases with less clear morphology (*EDST2001*, *2093*). In any case the presence of these pieces and the broken blades is suggestive of a mesolithic date. Bipolar cores are another interesting feature of the site and often demonstrate the final reduction of small or crude raw materials. Alongside these artefacts are a few formal cores. These are generally irregular, with a number of blade and flake platforms and difficulties with hinging although the presence of a fine unifacial opposed platform blade core (*EDST2110*) should be noted. This core has a very lightly retouched possible convex scraper edge on one side. Although this retouch is not confident, and there is little sign of edge damage it is surprising that such a high quality core should be used in this fashion when many cruder cores have been abandoned.

A total of five retouched artefacts (including the core scraper and the microburin) have been identified. None are of classic morphological types. The most interesting artefact is a fine bulbar tertiary chert blade with the distal section missing (23 x 12 x 4mm, *EDST2009*; Figure 269). This has microlithic backing to the right hand side and smaller microlithic blunting to the left-hand side. Two shallow notches are visible at the bottom of the left-hand side, above the break. A double backed blade of comparable size from Rink is illustrated by Mulholland (1970: Fig. 10. #118) as well as a range of notched tools. A tool with similar shallow notches was also found at Manor Bridge in association with mesolithic artefacts. Although it is difficult to be certain the artefact may have mesolithic affinities. EDST2008 is distal fragment of a high quality, thick-sectioned chert blade with fairly acute angled retouch; it is too small to classify. *EDST2032* is a fragmentary retouched piece, possibly broken during the removal of a rejuvenation flake, possibly deliberately split by a bipolar blow. A possible anvil stone, with light damage was also recovered from test pit 160/80.

The small assemblage from Edston 2 is rather ambiguous and frustrating. There are a number of hints of mesolithic stone working activities, the importance of regular blades, formal blade cores, some bipolar knapping and artefacts with mesolithic affinities such as microburins and unusual microliths, but there are few direct morphological referents. Notwithstanding these factors it seems most likely that this small assemblage has been generated through some kind of mesolithic activity.

2.2.3: Discussion

The chipped stone scatter identified by fieldwalking and explored by test pits lies just below a break of slope on a gently domed ridge on the relatively steep north banks of the Tweed at *c.* 205m OD. It is possible that the scatter has been pulled slightly down-slope from this ridge by the action of the plough. Although the site is some distance from the riverside from the level area immediately above the flint scatter commanding views of the complex river intersections of the Tweed, Lyne and Meldon are available. Vision extends to the standing stones at Sherrif Muir (NT24SW 1), and the neolithic enclosure and microlithic findspot at Meldon Bridge (Burgess 1976; Speak pers. comm.). Many of the fields immediately by the Tweed are haugh lands, although a number of ridges rise above this floodplain. The field itself contains several very boggy areas, presumably wetter in prehistory. A much larger, although steeper ridge is *c.* 150m east of the site; it was not possible to examine this intensively through fieldwalking

Although it was difficult to define its edges the site appears to be small, certainly less than 20m in any one direction. Small sites have played an important part in interpretations of mesolithic landuse, and have often been understood to be fairly small scale, temporary camp sites. However there is a fairly large quantity of lithic debris at Edston 2. Excavating $0.5m^2$ test pits on the grid system utilised gives a 1% sample of the total. Twenty-nine lithics and one possible anvil were recovered, suggesting that in the small area covered some 2900 lithics are present. The assemblage is not very informative about the range of tasks being undertaken on site, and such a small sample should be treated with some caution. Nevertheless there are some indications of tool production, in the form of snapped and broken blades. However, alongside this formalised technical process, possibly the maintenance of tool kits, are hints of more fluid actions: bipolar cores and crudely tested materials. Chert is common in the area, one pebble source is known at the junction of the Meldon and Lyne (Wickham-Jones and Collins 1978) and more is caught up in fluvio-glacial terraces, and it may be that these sources provided a different group of activities to carry out on site. The lithic assemblage is clearly 'incomplete' in the sense that the finished tools have been removed from site, reminding us that mesolithic sites are but part of systems. It is impossible to assess the duration of the stay at Edston 2 but it would appear that the area was not frequently visited. There is a very small background scatter of artefacts in the field, but this is frequently found on fields in the area and the scatter seems to stand alone. Of course, 10m fieldwalking intervals may have missed small scatters, and other sites could lie in the areas not explored but Edston 2 is less intuitively attractive than other spots in the local landscape and it may have been only visited rarely.

2.2.4: Acknowledgements

I would like to thank Mr Thomas Brotherstone of Edston Farm for permission to undertake fieldwork on his land, as well those who assisted: Graeme Cavers, Mike Church, Bill Finlayson, Darcey Francis, Mel Johnson and Bob Knox. Any errors, of course, remain the sole responsibility of the author.

2.3: Excavations at Manor Bridge

This document outlines the results of small-scale excavations and analyses of surface collections from a mesolithic site in the Tweed Valley. The site includes a range of mesolithic artefacts as well as a pit, a stone feature and environmental remains preserved under redeposited sands.

2.3.1: Background

Mr Bob Knox, now Chairman of the Peebles Archaeological Society, had collected artefacts from near Manor Bridge for many years. These lithics had often appeared in erosive contexts or molehills and formed a substantial, valuable collection (Cowie *et al.* 1986c). Mr Knox kindly donated these artefacts to the author in order to allow them to be examined as one aspect of research into the character and extent of mesolithic settlement in the east of Scotland. In the July 1998 a series of test pits were excavated at Manor Bridge in order to further examine the character of this site, retrieve a controlled lithic sample and to attempt to recover information for radiocarbon dating.

2.3.2: Location

Two related sites were examined at Manor Bridge. The first is a small area of a rock outcrop immediately to the north of the River Tweed, the Popples, and the second a ridge above this site, a field in rough pasture ('Cow Field') (Figures 211-214). The two sites are separated by the old Tweed Valley rail-line, now a very popular footpath. The Tweed at Manor Bridge is joined from the south by the Manor Water. The Tweed itself is some 20-30m wide, bounded by low floodplains to the north and south. To the immediate east of the site the valley narrows sharply into the Neidpath Gorge, which opens at Neidpath Castle, a short distance upstream from another mesolithic findspot at the Dookits (**App. 2.2**). To the west of Manor Bridge the landscape opens up, large hills rise but the valley is broad. (Figure 215) Most of the land is pasture but occasional crops of barley are sown. The junction of the Manor and Tweed is marked by extensive gravel spreads, and the landscape marked by relict fluvial features (Rhind 1968). The Manor-Tweed confluence is a well known salmon fishing spot, the low gravel pools providing a resting place for salmon before they continue their journeys upstream to spawn. Today the salmon run occurs throughout summer and autumn, especially the latter. The outcrop of bedrock at the Popples sits directly above the river, and the rocks extend into the water line. Immediately to the west of the Popples is a low modern floodplain. No artefacts have been recovered from this context.

2.3.3: Methodology

Excavations were carried out between the 6th and 24th of July 1998. In each of the areas investigated 1 x 0.5m test pits were excavated by hand in *c.* 5cm spits except where archaeological features were identified. All features were examined to determine their archaeological significance, complexity and meaning. All spoil was sieved with a 5mm mesh. Finds were recorded by approximate vertical depth. All pits were excavated until clean subsoil was identified. For each pit a complete soil profile was recorded, and where appropriate, plans and sections of archaeological features were drawn. Soil profiles are presented on the Manor Bridge database. Photographs were routinely taken of soil profiles and any visible features.

The test pits were arranged to examine the materials discovered on the outcrop (Figure 216) and the character of the lithic scatter identified by Mr Knox in the field above. Test pits were originally identified by co-ordinate and later each pit was attributed a code (Figures 217, 218).

2.3.4: Results

The results are presented in two sections; first, the rock outcrop itself; and second, the ridge above this.

2.3.4.1: The Popples

The test pits focused upon the extreme west of the rock outcrop, the area of the greatest concentration of surface finds. This distribution may be a product of the extent of modern day gorse cover on the site. Artefacts were concentrated on the flat surface of the outcrop but were also found at the riverside, and in erosive contexts leading down from the outcrop. The light sandy soil on the outcrop is extensively disturbed by moles as well as by animal trampling. Four test pits were excavated in the limited space available, all had similar soil profiles, except where interrupted by archaeological features (Figure 219).

In all pits natural subsoil (**112**, **205**, **309**, **406**) was identified at approximately 60-70cm, and was marked by an abrupt transition. This was a yellow-orange, slightly compacted medium-sand with very few slightly rounded sedimentary inclusions. Overlying this were a series of medium-sand deposits, varying in composition and with indistinct boundaries. In all cases these sands changed consistently over the outcrop: loose pale-brown sand with a few small sub-angular sedimentary inclusions at the surface (**102**, **202**, **302**, **402**) overlying increasingly brown/orange-brown sands with more frequent, larger and increasingly rounded inclusions (**103**, **104**, **203**, **204**, **303**, **304**, **305**, **403**, **404**). In places this was seen to overlie finer orange sands with fewer, rounder inclusions (**306**, **405**). All of these sands incorporated occasional larger, angular medium inclusions (these can be seen in Figures 220, 222). In PP4 excavations revealed a highly weathered bedrock surface at 67cm. This was heavily striated, running from approximately northwest-southeast. Worm and animal movement of these light soils was quite extensive.

A variety of definite and potential archaeological features were identified in PP1, PP2 and PP3, all at approximately 50-60cm. Many of these features showed signs of disturbance by root and burrow. No old land surface was identified.

In PP1 a series of irregular stains, partly disturbed by burrows, were identified (Figure 220). Concentrations of charcoal, carbonised hazelnuts and lithics were identified within this feature, beginning at 50-55cm. Individual context numbers were originally assigned to varied areas of this feature, in an attempt to differentiate between areas of staining. This level of detail has not been helpful and the feature is treated as a unit in this discussion. The varied highly stained and disturbed soils formed the fill of an irregular scoop along with dark brown sands (**109**) overlying the subsoil which was slightly pink in places, possibly affected by heat (**112**, **117**). In the small area excavated it was not possible to determine the extent of this feature, nor, unfortunately, was it possible to clearly determine a cut edge. The main stained area is approximately 20-25cm deep. Artefacts and ecofacts were recovered from throughout the stained area. A number of medium-large sedimentary rocks were recovered from the disturbed area, many of these showed signs of heating. Carbonised hazelnut, charcoal and very calcined bone were found in samples taken throughout. Lithics were found throughout the features and in large numbers in the sands immediately above the feature. Although the purpose of this feature is unclear it seems likely to have been some kind of pit, with redeposited burnt material included in it. The extremely low quantities of charcoal suggest that there was no *in situ* burning.

In PP2 a layer of large sub-angular rocks was identified resting upon and within loose brown sands (**204**) at 56cm (Figure 221). 57.8% of the lithics recovered from this pit were found in this soil layer. The purpose of this small area is hard to ascertain but the feature is not natural. It may form part of a small area of cobbling or a stone setting of some kind.

Due to the identification of small enigmatic areas of stained soils in the north face of the PP3 excavation was expanded. Unfortunately the features remain difficult to interpret (Figure 222). A small concentration of blades was recovered in association with these features (*PP3A/30*-32). At approximately 65 cm a series of small stains (**307**, **308**) were noted in orange medium-fine sands (306). These were disturbed by burrows. Within **304** a hammer stone and coarse stone tool were identified lying side by side at 42cm.

It would be easy to make too much of this range of enigmatic evidence yet, in conjunction with the quantities of lithics recovered (see below) it is possible to make a series of suggestions about the remains on the outcrop itself. Possibly covered with a fine sandy soil the outcrop appears to have been the focus for a number of activities during the mesolithic period. These activities have their clearest record at approximately 55cm in depth and include a possible pit and stone feature. Changes in soil composition at *c.* 50-60cm can be observed in all pits, and it is possible that an ancient land surface lies at this depth. Varied deposits of sand have accumulated over these features and these layers are now rich in artefacts. The extent of disturbance by roots and moles may explain some of the movement of artefacts through these fine sands deposits. The sands have certainly facilitated the preservation of the archaeological features in the area. The small samples of hazelnuts obtained will not be presented for radiocarbon analysis at this stage due to the extent of disturbance of the pit from which they derived.

2.3.4.2: The 'Cow Field'

A total of eighteen test pits were excavated in the field above the rock outcrop. These examined the distribution of material in relation to the prominent ridge in the field (Figures 223-224). All pits revealed very similar soil profiles (see CD-Rom). Any slight differences are related to the position of the pit relative to the slope. In no instance was an old land surface preserved.

In most pits a natural till sub-soil, comprised of varied orange-brown gravels including medium and large sedimentary inclusions, was overlain by 25-30cm of medium-dark brown plough soil. The ridge is variable in composition, in places the natural soil was pure sand (PP16) or pure gravel (PP15), in other places clay (PP20). This variation effects the drainage of the ridge, reflected in its use as rough pasture. The distributions of artefacts were clearly related to areas of better-drained soils on the ridge. Bedrock was identified in a number of test pits at differing heights (Figure 227). On the slope down from the ridge greater deposits of loose gravel and sands overlay the subsoil and considerable quantities of artefacts were sometimes found in the upper layers of these pits (PP10). This suggests that the topography of this ridge may have been considerably softened over time by soil movement down-slope (also indicated by the sand accumulations on the outcrop itself). Originally the slope down from the ridge may have been steeper and rockier, and the ridge itself a more dominant feature of the landscape. This ridge provides the main focus for activity, and higher densities of artefact were discovered on and just behind it. The ridge provides good views along the valley system, and overlooks the site at the Popples.

2.3.5: Chipped Stone

A total of 916 small stone artefacts are in the collections analysed from Manor Bridge (Figures 227-231). Nineteen of these are natural pebbles of chert or agate, or slag, leaving 897 artefacts. Alongside these chipped stones are an anvil (Figure 232) and a distinctive large quartzite pebble with rounded ends and possible flakes removed to enable it to fit the hand. Both the latter were recovered from PP3B, adjacent to each other at 42cm depth.

The condition of the artefacts in the collection varies widely (Figure 233). 204 artefacts (22.7%) were broken. Burnt artefacts are a significant part of the collection but these are not distributed evenly over the site. Sevety-eight of the burnt artefacts (75%) were found on the Popples and fifty of them (48.1%) were found in Pit 10/1.

The materials utilised at Manor Bridge were dominated by chert (Figure 234), which comprised 82.7% of the artefacts collected. Flint was an important resource (11.5%) and other materials included chalcedony, agates, and some coarse mudstones.

The chert ranged slightly in colour. Grey-blues were most common, but dark grey, blue-grey and grey chert were also important. Some pieces are a purple-brown colour, this coloration occurs naturally within Southern Upland cherts, and indeed a number of blue-grey artefacts have purple-brown patches. The chert varies between rolled material that seems likely to have come from pebble sources and fresher partly cortical items almost always of a grey-blue colour. (This latter source was particularly significant for formal cores.) Chert quarries are known in the vicinity of the site and this material is likely to derive from these sites. The flint was mainly grey in colour, 23.1% of it is cortical and this is often battered, suggesting that this was probably derived from pebble sources, although none are known locally.

A variety of artefact types were found (Figures 235, 236). Chunks and irregular flakes of both flint and chert comprise 55.7% of the collection indicating that production of both materials was taking place *in situ*. Small débitage, including material of *c.* 1mm in size recovered from sample residues is further evidence of this.

The sixty-two cores recovered allow some comments to be made about the character of stone craft at Manor Bridge. Of these 57 (91.9%) were of chert and only four (6.5%) of flint. It is interesting that only one of the four flint cores was whole. 75.4% of chert cores (43/57) were whole when deposited. The irregular cores were exclusively manufactured of chert, and thirteen of fourteen bashed lumps were also chert. This implies some distinction between the raw material types. It is also interesting that although cortex is rarest on blades, the distinctions between the varied flake types are not large and cortical material is always rare. This may be due to the use of pre-prepared cores rather than extensive *in situ* testing although this clearly did take place. In comparison to the general collection the chert used for formal cores is more consistent, often of a good quality grey-blue flint with patches of fresh tan cortex. It is likely that this material was quarried or collected from exposures of *in situ* chert. Chert cores ranged widely in size. Both formal platform cores and informal irregular cores were present. There was little to distinguish these by size (Figure 237). Of the forty-five complete cores twenty-four (53.3%) were formal blade/flake cores with prepared platforms. Of these ten were two-platform cores and fourteen unidirectional. Many of the formal cores have also had less regular removals taken from them. The platform cores range in type: unidirectional cores are cylindrical not pyramidal, but removals rarely extend around the whole of the platform. Two-platform cores are often opposed: this may be of the same face of a core (*PP05/02*) or on reverse faces of the core (*PP03A/06*, *KNX0131*). Differentiating between blade and flake removal on these chert cores is difficult, many cores have both kinds of negative scar. Both techniques involved the use of small amounts of platform preparation, this often seems to have taken the form of platform isolation (see below).

Production aimed at the production of blades and ninety-three of these were identified at Manor Bridge. Flint was preferentially utilised for blades and regular flakes (Figure 238). Flint blades also differed in size and shape from chert. (Analysis only based on intact, unmodified blades). On average flint blades were larger than chert, and they varied in length more. Chert blades tend to be slightly narrower than those manufactured upon flint (Figure 239). This difference is clearly demonstrated in Figure 240 which shows the absence of narrow flint flakes and suggests that blades of *c.* 9mm in width were important and that chert blades of *c.* 6mm width are characteristic. However regular flint flakes differ little in size from chert flakes, only varying slightly more in length: this suggests that physical properties are not solely responsible for the dominance of wider flint blades and it may be that wider blades were preferentially manufactured with flint. The average length of chert blades only slightly exceeds that of regular flakes whilst flint blades are notably longer. Both averages are coherent with the average core size of 27.6 x 25.1 x 16.5mm noted above.

Platform preparation was significant at Manor Bridge (Figures 241-245). A basic analysis of this was carried out, differentiating only between 'simple' preparation (scrubbing of surfaces, platform isolation) and complex preparation (facetting etc). Notes were also made on the character of the bulb of percussion (Figure 246). The presence or absence of preparation could be noted upon 222 pieces. These analyses indicate that greater care was expended upon platform preparation of blades and regular flakes than on irregular flakes. (The seemingly high proportion of irregular flakes with preparation may also partly reflect the fracture characteristics of chert, which tend to inflate the number of 'irregular' flakes in any assemblage.) If we look in more detail at the patterns of preparation it is also clear that greater efforts were expended upon flint than on chert. Preparation mainly took the form of simple platform isolation. This is also reflected in the size of platforms. Notes on bulbar type were also taken. This was relatively uninformative: the dominance of flat and diffuse bulbs on chert may partly reflect the geometric and planar fracture qualities of this material. This pattern may suggest that a variety of percussive techniques were utilised.

This range of percussive evidence, when considered in conjunction with the size of cores noted earlier suggests that there was a flexible approach to reduction at Manor Bridge. Formal cores were important and these may have involved the use of indirect percussion and possibly the use of clamp to hold such small cores. Other reduction techniques were also utilised although the general absence of bipolar knapping is of interest. The reduction technology aimed at the production of regular flakes and especially blades. Flint may have been preferentially utilised for the production of longer blades and flakes, and more effort was expended on the production and preparation of items from this raw material.

A total of ninety-five (10.6%) artefacts from Manor Bridge have definite or possible retouch. This varies widely in type, from formal modification of the shape of blanks or small irregular retouch of unclear intent. This proportion of retouched artefacts is very high and may reflect curation of materials as well as the difficulty of differentiating irregular retouch from edge damage on chert. Flint blanks were much more likely to receive further modification than were chert (Figure 247). This is in keeping with the general distinction between the patterns of use of the two raw materials.

There are twenty-seven microliths amongst the collection, eight of flint and nineteen of chert. These range in condition and type, two are rolled (*KNX0063*, *KNX0213*) and one is abraded (*PP01/60*). These differences in condition are not related to morphological distinctions. Many are fragmentary, and some are not of clear formal types. Scalene triangles (*PP14/11, KNX0204*), crescents (*PP06/13*) and backed blades of varied sizes (*KNX0002*, *KNX0245*) are significant, the latter mainly seem to be retouched on only one side (*KNX0176* is an exception). A number of artefacts fall between these overly rigid formal categories (Finlayson *et al.* 1996). *PP01/60* for example falls somewhere between a backed blade and a crescent, and *PP3B/12* is a rather unusual triangle. Some larger microliths are present; *PP08/03* is a 9mm wide bulbar blade of grey-blue chert with a right angle truncation, *KNX0198* is a distal fragment of a narrow blade with an oblique truncation, *PP04/12* is truncated and partly backed. *KNX0039* is a very interesting irregular blade with irregular retouch forming a series of small notches. *PP3A/19* is a large incomplete non-bulbar flint blade (36 x 15 x 5mm) with a series of light notches. Other interesting forms include the fragmentary *PP04/15*, a large very thin microlith, possibly of crescentic shape. *PP19/09* is very distinctive, a small (11 x 6 x 4mm) piece of flint retouched from both sides forming a regular point, some of the retouch was quite invasive. Four microburins were identified; *KNX0146* and *KNX015* are both quite broad, 14mm in width at the break, and the notch on *PP10/25* does not align closely with the break facet.

Helen Mulholland (1970) highlighted the importance of triangles (especially scalene types retouched on the two shorter sides) and obliquely blunted points amongst the industries of the Tweed Valley, suggesting that aside from at Dryburgh Mains, trapezes and crescents were rare. In seeming contrast Haley's account of the material collected by Walter Elliot from Rink Farm, Galashiels describes fifty microliths (1990) and argues that these are dominated by 'rods', a description that includes single and double backed bladelets and needles. Scalene triangles and crescents (mainly blunted on the arc) were present in small numbers. Obliquely truncated blades were also present and varied greatly in size. The collection includes many fragmentary pieces and Haley's argument that rods dominate might be questioned: the general picture of a mixture of artefact types is however, significant. Caroline Wickham-Jones (n.d. a) examined twenty-eight microliths from redeposited mesolithic material at Springwood Farm, Kelso. These include twenty-one broad blade microliths (*c.* 10-17mm in width) and five narrow blade artefacts (*c.* 4-5mm in width) (ibid. 13). In morphological terms oblique truncations and microburins were significant.

In general the microliths from Manor Bridge appear fairly characteristic of the Tweed Valley. They include a range of raw materials and types, blurring the rigid categories of formal analysis and they include both narrow and broad bladed types. It has long been argued that this distinction is of chronological significance, and that the appearance of the two types together in many of the Tweed collections is of culture-historic importance (see for example Lacaille 1954; Mulholland 1970; Wickham-Jones n.d. a. for review). It has been hard to assess the validity of these claims given the likely longevity of the mesolithic occupation of the Tweed Valley and the character of surface collections.

A number of fine formal scrapers as well as more irregular forms are present. Many more irregular retouched pieces may have been utilised as scrapers, especially given the tendency of chert to fracture at near oblique angles. Formal scrapers include end of blade examples of varied sizes (*KNX0052*, *0144*): many have broken longitudinally (*PP01/04*, *PP01/159*). Steeper short convex scrapers were also important and these include the only two flint scrapers (*PP01/126*, *PP3B/10*, *PP02/37*, *KNX0009*). *KNX0125* includes a slightly convex steep scraper edge at the distal, a concave lightly retouched edge to the left and a small area of retouch at the proximal. *PP02/08* is a concave side-scraper. Larger scrapers include *PP04/08*, a partly cortical lump of dark grey-black chert with a small area of retouch. This piece is exceptionally comfortable to hold. *PP15/30* is an example of a more irregular scraper. *PP02/41* is an interesting thin flake with extensive blunting retouch and edge damage across the platform. Scrapers are common on Tweed Valley sites, thumbnail and end scrapers were noted at Springwood and Rink (Wickham-Jones n.d. a; Haley 1990). Little seems to distinguish the Manor Bridge material from these types.

A number of items have retouch that may have been designed to improve or standardise a cutting edge (*KNX0027*). Some of these are quite chunky flakes and may have been knives of some kind (*PP02/66*, *PP02/69*). *KNX0131* is a very distinctive large artefact with a regular section: retouch extends along one side and removals at one end may be associated with hafting. The light edge retouch on *PP02/11* appears to have been intended to standardise the shape of the artefact. A number of artefacts have had their shape altered notably: of these *KNX0076*, *PP08/01*, *PP19/24* may be edge-retouched gravers (no burins were identified). Many sites have large proportions of irregular 'edge retouched' artefacts, some of which may be the product of knapping experiments or apprenticeships. A great many retouched pieces at Manor fall into no clearly identifiable category. These include a range of retouch techniques; steep abrupt blunting, light edge finishing short invasive scars. There is little pattern to these artefacts, most of which are manufactured upon the local chert and many of which are fragmentary or of no clear morphological shape. *KNX0022* is a distinctive and interesting artefact of a unique red-brown flint. It is some kind of small core tool rough out (29 x 21 x 11mm), possibly never completed due to problems with the raw material. Small core tools of this kind are also known from Dryburgh Mains (Mulholland 1970 fig 3: 4, 5: Lacaille 1954, observations in NMAS; see Fig. 4)

2.3.6: Spatial Distribution

There are a number of interesting patterns in the character of lithics on the Popples outcrop itself and the cow field ridge above it. Of course, it is possible that the two areas are merely coincidentally juxtaposed, but the assemblage has a homogenous feel and it is certainly possible that two different areas of behaviour are being observed here. In any case, if not contemporary then the two areas demonstrate the varied character of different mesolithic settlements in the area. For instance, there are clear distinctions between the proportions of blades and cores discovered on the terrace in the Popples cow field and at the outcrop itself (Figure 248). Of twenty-three artefacts formally identified as scrapers nineteen were found on the outcrop itself. The ridge above the outcrop has higher proportions of chunks and cores (Figure 259) and fewer regular flakes or blades (Figure 260). It would be easy to stretch this evidence too far, but if contemporary it may be that the larger ridge is an area associated with production, whilst the outcrop itself sees a wider range of activity reflected in the diverse tool kit.

2.3.7: Discussion

The excavations at Manor Bridge, although small scale have been very informative. The surprising preservation of aspects of mesolithic structures under redeposited sands on the Popples is of national importance, as pockets of preservation are very rare in inland Scotland. Further work on site is a priority. Above the Popples further mesolithic artefacts are found in concentrations on a ridge overlooking the site. Interestingly, these scatters have slight differences in composition from the rock outcrop itself. Further finds of mesolithic material have been made from over the river at Bellanrig, and over the road at Plantation, as a continuation of the 'cow field' site (**App 1.1.24-6**). Future research in the area should include a further examination of all of these sites in order to assess their relationships.

2.4: Excavations at Rink Farm

2.4.1: Abstract

Excavations were undertaken in July 1999 at Rink Farm, near Selkirk to explore the geomorphic context of surface lithic scatters on the lowest river terrace here. It seems likely that the material forms part of colluvial deposit.

2.4.2: Background

Rink Farm (Figures 27-47; *c.* NT4832) is one of the more productive flint scatters in the Tweed. The collections of material are wide ranging and have been commented upon since 1931 when Mason published an account of 'pigmie' flints at 'Tweed Bridge' (Mason 1931). Mason observed that thousands of flints had been recovered, including chips, and hammerstones alongside 80 'pigmie' artefacts (those illustrated include triangles and rods). He also comments on the presence of barbed and tanged and leafshaped arrowheads, a stone ball, a bronze pennanular bracelet fragment, a polished stone axe and sinker stones (Mason 1931). Mason says that all of the finds come from field C (Figure 29) and that no material came from the haugh lands beneath this, attributing the lack of artefacts to changing river channelisation. Armand Lacaille notes in passing that Rink is of interest because of its position on a raised knoll, unlike many other mesolithic sites in the valley which 'as a rule ... have been found on the low ground near the rivers (Lacaille 1954: 163).

Helen Mulholland discusses nine artefact concentrations, 'each of which covers an area of 20 to 30 square yards' (1970: 81). She states that two of these come from the foot of the bank on the lowest fragment (Field A, see also Rhind 1968). Mulholland excavated 25 square yards in field C and discovered a layer of large stones at between 10 inches and 2 feet depth, deeper nearer the edge of the terrace. Above this a red-brown sandy soil is recorded, which at a height of two to three feet gives way to a 'fine grained orange soil' (Mulholland 1970:85). It is unclear what relationship this bears to the stony layer. Six flints were recorded from below the stony layer, 153 from amongst it and over 800 from the upper soil (1970:85). She argued that the mesolithic land surface was immediately above the stony layer and that the incorporation of material into the stones was the product of animal activity. The exact location of Mulholland's trench is unknown although photographic evidence (Figure 32) and comments by Walter Elliot suggest that it was near the edge of the terrace towards the centre of field C. The stratigraphy may relate to Lateglacial activity in the area (Rhind 1968).

Rhind (1968) also discusses the artefacts from the lowest terrace (Field A). He suggests that 'geomorphologically the most significant is a group found at (NT)48853230 on the rim of the lowest terrace fragment (F.414)' (ibid. 152). He argues that the artefacts must be *in situ* and that therefore the terrace itself must predate the mesolithic period (ibid.).[3] Therefore, 'the floodplain has long been about its present location. Thus it seems reasonable to suggest that ... the river gradually obtained its present level during and shortly after the dissolution of the glaciers. It is likely that since this period the vertical variations in river profile have been small, terrace formation being much restricted in comparison with that in Late-Glacial times' (ibid. 224). Rhind's argument (not based solely upon Rink) suggests that the bare bones of the Tweed landscape have changed very little since the early Postglacial and implies a high level of stability in the Tweed during the Holocene. In recent years as the dynamism of Holocene systems has been recognised such assumptions of stability have been questioned. Richard Tipping (pers. comm.) strongly believes that episodes of down-cutting and overbank

[3] Although his date for the artefacts of older than 4-5000 years is inaccurate

deposition have been significant. This argument implies that the artefacts present on the lowest terrace at Rink might not be *in situ.* The excavations aimed to examine these questions, which are of some significance for our understanding of many surface scatters in the Tweed Valley.

Rink Farm lies on the north of the Tweed at its junction with the Ettrick Water. This part of the Tweed system is notable for a variety of glacio-fluvial landforms lying within a generally steep valley. These have been mapped by Rhind (1968). In many places kames and eskers clearly identify terraces as Lateglacial in date, for example a kettle hole at NT48913268 is clearly beneath the level of the terrace fragment F.412 (Rhind 1968: 150). The lowest terraces in this area are also described by Rhind who comments that these 'flats' are 'scarred by several dry channels and are rarely stony, but usually of a sandy loam texture. Riverbank sections show this composition to persist at least as far downwards as the water surface some 4-6ft below, except for occasional gravel lenses' (ibid.).

The eastern low terrace (F.414) where T1 and T2 were excavated is generally as Rhind described, flat and incised with dry channels, although to the west, and under F.412 there is a notable slope across F.414, this will be discussed further below (Figure 33). At 5-10m in from the river cliff a low bank is clearly visible, an old storm dyke. The river sections often show sand, but cobble beaches are common and these include small amounts of low quality chert pebbles, often purple-rust in colour. According to Mr Bayne the extreme western end of the terrace (where the excavations took place) is uniquely stony in comparison to the rest of the field. Mr Bayne also stressed that this area was the least likely to be flooded. No artefacts have been recorded from elsewhere in this terrace (W Elliot pers. comm.).

The larger terrace F.398, in which T3 was excavated, lies immediately to the west of F.414 (Figure 34). It is also sandy in section and undulates gently, with clear dry channels. Mr Elliot suggests that this field produces 'neolithic' artefacts (pers. comm.) from the higher areas although it is unclear what artefacts he refers to; these finds are not referred to by Haley.

2.4.3: Lithics

Rink Farm was analysed by Gary Haley as an undergraduate dissertation (1990). He worked with Walter Elliot's collection of 8,925. He commented on the fragmentary character of the Elliot collection; a factor he attributed to the storage of this material in ice cream boxes. Haley undertook detailed analysis of complete flakes, cores and finished tools (Figures 332-334) and argued that the site is later mesolithic, with minimal later mixing. This assessment was based on metrical analyses of complete flakes and the formal properties of microliths. Haley believes these are dominated by rods (52%), although some caution should be taken with a figure that includes a great many broken examples. Although Mulholland's Table 1 (1970) is difficult to read, she also suggests that backed blades, rods and sauvetterian points were significant. Her analyses of the material, based on morphological typologies suggested Rink may have been an early part of the Tweed lithic traditions. Scrapers are dominated by shorter convex forms, made on a variety of raw materials, although end scrapers are also significant. In general scraper types are not highly standardised. Mulholland points out that concave scrapers are unknown at Rink (1970:95). Haley argued that no burins, microburins or heat treatment were evidenced at Rink and that the occupants of Rink apparently utilised direct hard hammer percussion (Haley 1990:68), mainly on single platform cores although there is reason to suspect that this appraisal is an oversimplification (**7.4**). Mulholland describes cylindrical and conical cores (1970:95). According to Haley 72% of cores have three or less visible removals and he links this to the low quality raw material utilised.

2.4.4: Methods

The excavations aimed to establish an accurate geomorphic context for the material discovered at Rink Farm and, by extension, some of the other sites in the Tweed. In order to do this a number of small sections were opened up in the lowest terraces: trenches 1 and 2 in F.414 (Figure 35) and trench 3 in F.398. Rhind's comments (above) and Walter Elliot's advice suggested the location of the first two trenches.

All trenches were initially 1m in width, narrowing slightly with depth and were excavated by hand. The ploughsoil and upper layers of T1 and T2 were sieved to facilitate artefact recovery. T3 was not sieved, although in these sandy silts artefacts would have been spotted. Full textual records and drawings of the section were made (Figures 36-44) and photographs were taken.

2.4.5: Results

Only one *in situ* archaeological feature was identified (**3002**), a small layer of cobbling in the upper part of T3 within overbank deposits of sandy silts (**3001**) (Figure 36). No finds were associated with this layer, although it might be noted that 40 centimetres below it modern glass was discovered, still within **3001**. The purpose of this feature is not clear. Aside from this the only archaeological material recovery was artefactual, from the plough soil or colluvial deposits below this. The character of this material is discussed below, at this stage it is worth noting simply that the bulk of the material is congruent with a later mesolithic date and that the fragmentary character of the material is paralleled by the rest of the Elliot collection.

2.4.5.1: Trench 1

Trench one lay 15m from the riverside, just up-slope of the low bank and lay within a low channel visible on the surface of F.414 (NT4886032328). 115 lithics and nine post medieval finds were made from the ploughsoil (**1001**) which directly overlay a sequence of fluvial and fluvio-glacial deposits. These are described from the base upwards (Figures 37-38).

At the base of the trench was a sequence of sands and gravels incorporating very frequent and very large clasts (**1011**, **1012**, **1013**, **1014**, **1015**). These clasts ranged from rounded through to sub-rounded and angular material, mainly of local stone and there was little clear imbrication. The size of this material strongly suggests that these were deposited in a glacial or immediately periglacial context and they seem likely to be Late Devensian in age. Overlying these gravels were smaller and finer materials (**1006**, **1007**, **1009**, **1010**, **1016**). These included small discrete imbricated lenses of sands and fine gravels (**1009**,**1016**). **1008**, incorporating much larger material, including subangular clasts, had interrupted the deposition of this lighter material. This layer was also imbricated and there were hints of banding amongst the smaller clasts within it. These are all clearly glacio-fluvial deposits of differing types although their date is not clear.

These features were overlain by two further fluvial features: **1007** and **1006** are matrix supported gravels with little or no sand content and no organic material of any kind, the latter of which has clear imbrication. Many of the clasts in this layer were small and platy. Richard Tipping (pers. comm.) suggests that these deposits may represent Younger Dryas episodes of accumulation and deposition.

The next clear layers seem to be much later in date than these gravels. There are two clearly visible coarsening up sequences, **1005**, and **1003**. These deposits sit within a slight channel in the surface of **1006** (although differentiating the boundary between **1006** and **1004** in the northern half of the section was difficult). **1005** is a firm tan silt layer, becoming increasingly coarse with height and eventually grading into small and very small platy pebbles. This in turn is overlain by **1004**, a loose gravel and sand deposit which is also imbricated and cuts **1005** to the north of the trench. **1003** in turn cuts **1004** and is similar to **1005** in form; it too is a coarsening up sequence of waterborne material. This layer in turn is sealed by **1002**, a coarse sand gravel with hints of imbrication. Coarsening up sequences of this kind, with little bulky material are commonly considered to be late Holocene in date.

One interpretation of this sequence is to suggest that a terrace fragment existed in this location from the Lateglacial. Although this stability in such a low terrace might seem surprising, the proximity of outcropping bedrock at, and above, river level within 30 metres of the trench is probably a contributing factor in maintaining channel stability at this point (Figure 45). This glacial surface is overlain by Younger Dryas material, associated with a valley-widening episode. Then there is a hiatus in our record before the deposition of late Holocene material in channels in the Dryas gravels. One explanation for this might be that any early Holocene land surface that had existed above the Younger Dryas material has been scoured out by the processes of channel formation in this area (crevasse splay). This implies that any mesolithic surfaces in this trench have been removed.

2.4.5.2: Trench 2

Trench 2 was located immediately up-slope from T1 in order to examine the terrace away from the channel itself (NT4885532331). In its basal layers T2 (Figure 39) is very similar to T1; lenses of large gravel and finer gravels all suggest a glacial or periglacial depositional environment (**2006**, **2007**, **2008**, **2009**, **2010** etc.). **2005** appears to be the last Devensian deposit, and is overlain by a series of light sandy gravels (**2003-2004**) which appear to sit in slight channels. **2003** in turn is overlain by a clear layer of dark tan silt (**2002**) which included large charcoal fragments, lithics and post medieval artefacts. This layer appears to be a colluvial deposit, as the silt particles within it are not found within the fluvial and glacial deposits beneath it. This is sealed by a plough soil.

Although the sequence in this trench is not as clear as that in T1 it is possible to infer a similar history of formation. A late glacial terrace has had its early Holocene surfaces scoured by channel formation. Over time these channels have fallen out of use, replaced by those immediately down slope, and an accumulation of colluvium, probably derived from the slopes of F.412 (immediately to the rear of the terrace at this point) has taken place certainly from the post-medieval period and possibly from earlier.

2.4.5.3: Trench 3

Trench 3 was located in F.398, to the west of the other trenches and was very different in character (NT482832302; Figures 40-41). Here 80cm of firm silts and sands, **3001**, including modern glass at 70cm of depth, overlay a sequence of fine gravels and sands. In places these gravels were oxidised and stained, and at **3005** a strong iron pan had formed, cementing small and medium clasts. Context **3003** may represent an old land surface with precipitation from this layer forming an iron pan beneath it. The iron pan overlies another compacted partly oxidised sand layer which in turn seals a compacted grey and orange gravel and sand layer incorporating larger material, not previously encountered in this trench. This sequence appears to derive from late Holocene overbank sedimentation burying an earlier, lower gravel land surface, potentially of mesolithic date (Tipping pers. comm.). The date of this overbank accumulation is unknown.

2.4.5.4: Artefacts.

146 lithics were recovered from the excavations at Rink Farm along with a total of fifteen pieces of post medieval ceramic, and nine of glass. All of the artefacts came from T1 and T2;

from ploughsoils (**1001**, **2001**) and the colluvium immediately underlying this (**2002**). The finds are treated as a unit.

Most of the finds were fresh with some (n=7) patinating, and a few (n=2) lightly burnt. Twenty-one artefacts were clearly broken, this must under-represent the true figure as breaks are very difficult to spot on the crude chunks and irregular flakes that comprise the bulk of this collection (Figures 46-47). Formal artefacts (cores, blades and retouched pieces) were rare: this may reflect the longevity of collection on the site.

The finds are dominated by chert (n=117, 80.1%) with flint also significant (n=23, 15.7%). Worked chalcedony was also present, and some natural quartzites (the latter are excluded from this analysis). The cherts were of a blue-grey colour, ranging widely from dark to light. The occasional brown or black chert was also noted. Few primary cherts were noted (n=4, 3.4%) but secondary pieces (n=60, 51.3%) were present in some numbers. Tertiary flakes were significant (n=53, 45.3%). On some pieces abraded rolled cortex was clearly visible and although this variable was not quantified it seems likely that secondary cobbles were utilised. Walter Elliot argues that such pebbles can be found in erosive contexts in the scarps leading up to the Lateglacial terraces. A small amount of coarse chert, red and brown in colour, was collected from the banks of the Tweed, this chert is not of knappable quality. The flint was exclusively white, cream or very light grey in colour. Primary flakes were absent, and secondary (n=12) and tertiary (n=11) artefacts were equally common. The source of the flint is unknown although a pebble source seems most likely. Flint is preferentially utilised for regular flakes and blades and cores (although these latter are not formal examples).

The collection is dominated by production waste – irregular chunks and flakes. A small proportion of blades are significant (n=11, 7.5%) as are regular flakes. These blades and flakes, which sometimes show careful preparation (Figure 47; *RNK013*, *016*, *007*) have clear mesolithic affinities. Two formal blade cores were found (*RNK102*, *105*), both are small (maximum dimension 22mm) cubical two platform cores with occasionally opposed removals. Three less formal cores were identified; these are not diagnostic.

Four artefacts had been retouched. *RNK151* was a fine, small broken bifacial arrowhead discovered towards the bottom of the colluvial deposits in T2. Measuring 13 x 10 x 2mm the translucent cream flint has delicate invasive retouch on both sides as well as smaller edge working. The point of the arrowhead is still sharp but one extreme at the base (on the right hand side as illustrated) is missing. The arrowhead is of neolithic date.

RNK004 and *099* are similar artefacts. In both cases an orange mottled flint (?chalcedony) blade has received inverse retouch. On *RNK004* this short retouch forms a knife like edge whilst on *RNK099* the blunting has formed a light notch. Both artefacts have mesolithic affinities. *RNK010* is a more unusual artefact: it is a chunky flake of blue grey chert with an irregular possible notch on the right hand side at the distal.

RNK069 is an interesting artefact. It is a large (48 x 18 x 12mm) piece of homogenous black chert, of an unusually high quality. It appears to have been hit hard as removals can be traced on both sides of the item forming a light wedge. It is hard to assess what this artefact might be but the presence of such high quality chert, and the fact that it is has not been used for formal cores is interesting.

The collection from the excavations at Rink is not greatly informative. Many thousands of artefacts are already known from Rink and these 146 generally fit into the picture already gained, that the site is dominated by mesolithic activity although occasional finds of later material are made.

2.4.6: Discussion

The small-scale excavations undertaken at Rink have helped to clarify the geomorphic context of the artefacts recovered from the lowest terrace F.414. In short, it appears that these concentrations are likely to have been derived from up-slope, on the higher bluffs overlooking the river. The colluvial deposits in this part of the field may explain the slope across the field in this location noted above. In turn this redeposition may help to explain the rather fragmentary character of the artefacts discovered in the lowest field. It is interesting to reconsider Mason's comments that no artefacts were found in the lower terrace at the start of this century. This may imply that there has been considerable colluvial movement since this time, possible associated with agriculture or road building. The lack of artefacts from F.398 may be explained by the presence of large deposits of over bank sediment above the possible land surface

It was hoped that the excavations at Rink Farm would enable wider hypotheses about the context of Tweed lithic scatters to be made. Unfortunately the results are not conclusive, because the particular location of Rink, at the junction of two large rivers, and in an area with exposed bedrock, appears to have been significant. Certainly the complexity of the river system is clearly demonstrated by these results, and caution should certainly be taken in assuming that other scatters of material on the lowest banks of the Tweed are *in situ*.

2.4.7:Acknowledgements

The excavations were enabled by a grant from The Russell Trust and I am most grateful to them. I would like to acknowledge the kindness and co-operation of Michael Bayne (Rink Farm) for allowing the excavations to take place. Richard Tipping and Bill Finlayson advised during the excavations, I am particularly grateful to Richard for his interpretations of the sections. Especial thanks are due to Rob McCrossan for assistance during the excavations. Walter Elliot's generosity and openness was most appreciated.

2.5: Excavations at Shiplaw

This document outlines the results of test pit excavations at Shiplaw Farm, Eddleston Valley, Scottish Borders. A small mesolithic scatter was identified on site and is interpreted as a short-lived settlement in an area possibly visited repeatedly. Other prehistoric activity areas on the farm are also noted.

2.5.1: Background

During walkover survey of Shiplaw Farm members of the Peebles Archaeological Society identified chipped stone tools in erosive contexts in rough pasture. A total of 35 artefacts (*SHP003-038*) were recovered from the northern banks of the Shiplaw Burn, a right bank tributary of the Eddleston Water at c250m OD (NT 24155090) (Figures 58-60). At this point the burn cuts through rolling fluvio-glacial topography, fairly steep slopes rise to the north and the burn itself shows evidence for a complex series of down-cutting episodes. The hillside has clearly been drained in the past and is presently rough pasture. Artefacts were recovered from a flat area with variable drainage above the terraces, the slopes of a well-drained ridge to the east of this and from the very tops of the slopes to the north. This distribution relates only to the presence of molehills and other disturbances. Despite the presence of many molehills on the south bank, opposite the site, no artefacts were recovered. Further artefacts have been recovered from elsewhere on the farm (see below).

The finds at Shiplaw were of some interest, especially because of the density of finds in erosive contexts and the fact that they included two identical broad blade microliths. In the context of research being carried out by the author the site offered some potential to contribute to our understandings of the character of mesolithic settlement in the area. Therefore a small-scale test pit campaign was undertaken on the weekends of the 10-11th and 17-18th of June 2000. Volunteers from local societies and the university staffed the excavation. The aims of the test pit campaign were

- to characterise the spatial extent of the scatters
- to obtain a controlled sample of material
- to ascertain whether any sub-soil features were still present.

Unfortunately fewer volunteers than anticipated were available for the excavations and consequently the area covered by the test pits was less than was hoped. Despite this, a small scatter was identified by the excavations, and sheds some light on the character of settlement in the area.

2.5.2: Results of excavations.

A total of 70 test pits were excavated. All test pits measured 1 x 0.5m, excepting pits A1 and A2 which were 1 x 1m, and were aligned with their long axis north with the southwest corner of the pit located on the grid corner. All spoil was sieved at 4-10mm and all worked or possible worked material retained for analysis. Conditions for recovery were variable: generally good but with heavy rain on Sunday 11th. Notwithstanding this, the standards of recovery appear to have been good, many small fragments and pieces of débitage were collected and the diligence of the excavators should be noted. The pits were laid out on a 20m square system using hand tapes and were located to within 2% accuracy. Lines (southto N) were labelled with letters, (Y, A, C, E, G and I) and distance (E to W) given a number (pits 0, 1, 2 through to 10) (Figure 61). Later pits, focusing on the main concentration identified, were given letter codes (B, BC, CD, D) (Figure 62) and distances in the grid system (60m, 65m, 70m, 75m, 80m). The location of all pits is shown on Figure 63. Some pits were moved slightly to avoid very wet areas or extensive rabbit warrens (see CD-Rom). The basic exploration of the slopes to the east was followed by a closer examination of the main concentration in order to delineate this feature, and a small sample of the large flat area to the east was also excavated.

All pits were excavated through plough soil and cleaned up at the subsoil, and basic records of the composition of the plough soil and sub-soils were made for each pit. A sample of pits were also photographed. All test pits, bar Y3 (see below), recorded sequences of plough soil over glacial till deposits. Both soil types varied spatially at a number of levels. The till deposits could be generally described as orange-yellow clays with variable quantities of sand or gravel (Figure 64) but this subsumes important variation relating to the topography. This complexity is clearly related to the differential drainage on the hill slopes, with some areas notably boggy and reedy. On the higher slopes to the east for example the sub-soils were reddish-brown compact clay-gravels with moderate small to large sub-angular and sub-rounded inclusions, whereas further down-slope mottled clays with few inclusions were noted. The sub-soils in the vicinity of the main concentration were still variable although yellow orange clays of varied types were important. On the flatter slopes to the east the sub-soils were much more consistent tending to be yellow-brown mottled clays with sand and few inclusions. These varied mottled till deposits were heavily disturbed by roots and burrows and any subsoil archaeological features would have been very difficult to identify; however I am confident that we did not miss any features. In some pits a weak incipient iron pan was forming at the base of the plough soil, whilst in others a slightly compacted stone layer was apparent at the base of this level. The plough soil itself varied in composition, drainage and depth across the hillside, in close relationship to the subsoils; in general it can be described as a loam with variable quantities of inclusions. Test pit Y3 was located on a small fragment of a fluvio-glacial terrace and contained 27cm of light brown silts with no inclusions, and occasional mottles of yellow with depth over yellow clays and silts. The sequence probably relates to overbank flood deposits of some kind. The ploughsoil also contained naturally fractured and rolled cherts, small chips of agate and quartz.

No archaeological features were noted in any test pit and the concentration of artefacts itself was very low, only 203 artefacts, on average less than three a pit, were recovered. Figures 61 and 62 show the distribution of material over the grid, many pits recorded low numbers of finds, and a general 'background' noise of 1-2 artefacts per $0.5m^2$ appears to be present. The anomalous nature of pit C3 is clearly apparent as is the small scale of the scatter itself. It appears to be delimited north-south on the BC and C lines and east-west on the 65-80m lines, although it may extend a further 10m west, the decision not to dig a test pit at BC85 and C85 is regrettable. Test pits were not excavated in C or BC 75 due to the presence of a rabbit warren. It is possible that the finds in C80 and BC80 do not relate to the scatter centred on C3, but to another scatter centred on C85 (for example). In any case the scatter is small, *c.* 10-5m north-south and *c.* 20-30m E-W, sat on and slightly falling down-slope from a well-drained knoll on the hillside. Away from here there are slightly higher concentrations of material on the higher slopes to the east (E1, E2, G1) and possibly something in the area of E4 and G5 but it is difficult to characterise thcese scatters. Pit A1, with 5 finds was a $1m^2$ pit, and therefore has only 2.5 finds per $0.5m^2$.

2.5.3: Chipped Stone

A total of 203 chipped stone artefacts and two possible hammerstones were identified during excavation and surface collection from the site at Shiplaw (*SHP002-208*). These were catalogued according to standard analytical principles (Finlayson *et al.* 1996). Most of the collection is in fresh condition, only two artefacts are abraded and seven are burnt, apparently in antiquity. The burnt material was concentrated in the area of the main scatter.

Many artefacts are broken (n=72, 35.5%) and a high number have edge damage, some presumably from the plough (n=15, 7.4%, no attempt was made to quantify the *cause* of edge damage). The artefacts are generally homogenous in type, and are treated as a unit in the discussion that follows.

Chert is the dominant raw material (n=192, 94.6%) with flint (n=9, 4.4%) quite rare, agate and quartz are both present as chunks or crude cores. The chert is all local Southern Uplands material, ranging from blue (5.4% of the fresh chert), blue-grey (51.1%) through grey-blue (21.7%) and darker greys (7.6%), sometimes green-grey, purple or rust coloured. 28.6% of the chert is cortical (primary n=6, secondary n=49, tertiary n=137). Some of the chert is clearly from derived pebble sources, with thick battered cortex or water rolled surfaces, in some instances however the chert does not appear to have been obtained from pebble sources, but is angular, 'nodule' like (*i.e. SHP155*). The chert also varies widely in quality and size and some very small pebbles and cores are exploited. Interestingly the chert in pit C3 is more consistent in type than across the assemblage as a whole, although no refitting was possible in a limited experiment. Most of the flint is fragmentary and it is hard to characterise this material, it is grey or honey coloured, and one example is from a very small water rolled pebble (*SHP058*).

Irregular flakes and chunks form 51.7% of the assemblage (Figures 65-66), indeed 26 pieces are smaller than 10mm in maximum dimension. This fairly high proportion of waste and débitage indicates that some tool manufacture was taking place in the area. The presence of a range of cores and split pebbles is also of interest in this regard. No core rejuvenation material was clearly identified (see below). Regular flakes and blades are also significant. These demonstrate a range of percussive techniques and platform preparation, in the context of an assemblage such as this it is difficult to ascertain whether this is a product of palimpsest, or perhaps more likely, evidence of flexible approaches to raw material of variable quality.

The ten cores present allow some comments to be made about the structure of stone working. Cores ranged quite widely in size, and included two very small examples. *SHP139* has two opposed blade platforms on one face of a very small chunky chert pebble; the striking face is only 17mm in maximum length. *SHP058* is an interesting flint core, manufactured on a very small rolled pebble. A unidirectional platform has been created by steeply angled blows in the opposite direction to this platform, the final pebble resembles a disc core but blade removals are only evident in one direction and it seem more likely that this is a result of the exploitation of such a small flint pebble. Both cores indicate a remarkable structuring of raw material use.

Larger cores are also present. Three cores have opposed platform removals on one face of a pebble, the rest have single platforms of varied types: none are exhausted, or indeed very heavily worked. The cores are not of classic morphological types, and many indicate serious difficulties with hinge fractures although in some cases it is difficult to establish a reason for the abandonment of the cores. Three bipolar cores were identified, one in quartz, but some other possible bipolar fragments were noted (*SHP184*). The chert bipolar cores were small, one attempted to split a very small pebble and others may have shattered small blades or chunks. The presence of a bashed lump and two split pebbles, of crude materials, adds some detail to the range of activities undertaken.

60% of blades and 48.9% of the regular flakes present are broken. Whilst in part this may reflect the fragility of these artefacts it is notable that many of the blade fragments are proximal and some may be deliberate. *SHP131* for example, has the morphology of a microburin although no notch is apparent (see also *SHP087*). Whilst this evidence is not conclusive it may have been that deliberately snapped blades formed a part of stone crafting routines. Complete blades range in width from 5mm to 19mm and no meaningful clear groups are apparent within this continuum.

Seven artefacts are clearly retouched, and a further five may have been retouched. However these artefacts have very irregular retouch that may be attributable to plough damage. Of the morphologically characteristic artefacts two almost identical large broad blade microliths are notable (*SHP003*, *SHP033*), both were found in surface contexts on the slopes of the ridge to the east. These are highly modified blades of blue/blue-grey chert, and morphologically they are similar to large scalene triangles but neither have a tip. They measure 27 x 11 x 3mm and 25 x 10 x 4mm respectively. A further blade (*SHP029*), although not modified, is a mirror image of these microliths. A small fragment of a geometric microlith, probably a rod, manufactured on grey chert is also present (*SHP116*). All of these artefacts would normally be considered to date to the mesolithic period. The presence of a mixture of microlith types is of interest as traditionally 'broad blade' and 'narrow blade' microliths are considered to have differing chronological associations. However in the Tweed Valley most assemblages are mixed and it is difficult to apply these chronological schemes. It is also difficult, even in the context of a controlled collection such as this, to associate the two microlith types clearly; either type may represent a chance loss on site.

Further retouched pieces are more irregular, *SHP016* is a flake with an inverse shallow 5mm long notch towards the distal and *SHP043* is a fragmentary ?convex scraper on a large flake. *SHP157* is a very unusual piece: it is a fine triangular sectioned bladelet (26 x 4 x 3mm) with its distal tip missing and some of the proximal also missing. Small, regular retouch has been initiated from this crest but it is not possible to ascertain whether this retouch took place after the removal or before it. The artefact would be a very unusual microlith, and has some resemblance to core or scrpaer rejuvenation flakes, but morphologically it does not appear fitting. *SHP150* is also unusual. It is a flake (18 x 14 x 6mm) with four notches, two adjacent to each other at the distal, and two on the right-hand side of the artefact immediately adjacent to these other notches, forming a weak 'point'. There is also a small area of inverse retouch on the left-hand shoulder and near the angle of this side with the distal, again forming a point. It is possibly some kind of graver although parallels are rare.

One possible and one definite hammer-stone were also identified. In pit A2 a fragmentary (?)greywacke pebble with some possible damage to one end was found (79/78/51). This may be a hammer-stone but is doubtful. Of more interest is a small circular pebble of battered crude (?)chert found in E3. This measured 51 x 49 x 35mm and had extensive damage to one end, it is a very nice small hammer-stone but appears to have fractured in use.

It is difficult to clearly date the assemblage which has affinities with both early and later mesolithic 'types'. It is more likely, perhaps, to be later mesolithic in date but it is impossible to rule out an early mesolithic date. The assemblage as a whole provides a number of hints of the character of activity on the site, but with such a small sample it is difficult to ascertain this clearly. The quantities of small débitage and irregular material indicate that tool manufacture was probably an important activity. The relatively low proportions of cortical material would also suggest that primary testing was rare and that Shiplaw was a place where existing materials were further worked, perhaps in the context of maintenance of tool kits. It is tempting to think that the larger, scalene like microliths are evidence of on-site production and maintenance of a tool, but they may easily have arrived on a stray arrow. The two small cores worked to absolute exhaustion are possibly evidence of curation of high quality raw materials. There are, however, also hints of some small scale testing of locally available materials, both by bipolar knapping and from cores with a few crude removals. The presence of a fragmentary scraper and unusual notched artefacts hints at a wider range of activities but this refuses resolution.

A range of other artefacts from Shiplaw is known. A grey flint thumbnail scraper from the G Leslie collection is held in the NMAS (NMAS: BMA 2253) and Shiplaw is listed in Mulholland's discussion of the Tweed Valley material although no details are offered. Members of the Peebles Archaeological Society recovered artefacts on other areas of the farm. One (*SHP001*, NT22555015) is a damaged and broken, quite elaborate, complex scraper and knife on a large blade of mottled grey flint. A fine chert leaf shaped arrowhead (Green 1980: type 4B) was also found on hills above and to the west of the field containing the mesolithic artefacts, a distance of *c.* 500m (*SHP039*), this was found with an irregular flake and a blade fragment (*SHP209-210*, NT234508). Two very diffuse scatters were found, six undiagnostic pieces at NT234504 (*SHP211-215*) and fifteen at NT231503. A single small damaged chunk of flint has also been found (*SHP002*, NT22655000).

2.5.4: Discussion

The site at Shiplaw is of interest for a number of reasons. The hill is covered in a low-density scatter of stone working, much of it seemingly mesolithic in date. Faint hints of concentrations can be found within the scatter as a whole, often on the flatter surfaces, and in one instance, in pit C3, a dense concentration was found. This concentration was very small, and rapidly faded away. This concentration might be where a plough has cut open a pit, or, possibly, other denser concentrations await us. Indeed one important consideration is the difficulty of identifying sites of this type in test pit, or even fieldwalking survey. A 20m x 20m test pit grid could *easily* miss these kinds of scatters. The concentration of material in C3 was remarkable and had a major impact on the structure of the rest of the excavation. Settlement types like this, a small scatter forming part of a wider landscape, are often difficult to identify and consequently we do not understand their role in larger settled landscapes clearly. More optimistically however, small sites are certainly easier to excavate!

The main concentration sits on a low knoll on south facing slopes above a burn overlooking a complex and undated terrace system, a 'classic' location for gatherer-hunter sites in the Tweed Valley. A short distance to the west the landscape opens out a little and is characterised by rolling loch and lochan topography. Undated pollen cores are available from Upper Eddleston and the Moorfoots (Newey 1967) and add some detail to our understandings of the early Holocene landscape of the area. Birch was the first coloniser with hazel rapidly becoming significant through the Boreal. Elm and later oak appears at the traditional transition from the Boreal to the Atlantic, and alder rapidly became significant in this fairly woody but damp environment. It is difficult to asses at which stage in this sequence the human occupation of the area took place, but in either case the diverse topography of the Shiplaw burn provided a rich, wet landscape throughout the early Holocene. A loch and lochan topography would have been probably very attractive to a range of birds whilst the Burn itself used to carry many salmon. Further west the valley sides rise to hills with outcropping chert and finally, the burn is on a major communications axis from the Uplands of the Tweed to the coast to the north.

The stone tools from site show evidence for structures of stone tool crafting extending across the landscape as a whole, for example the curation of cores. This, and the range of tertiary débitage (and a scraper rejuvenation flake?) is suggestive of tool maintenance and manufacture rather than stone tool procurement (although the situation is a little fuzzy). The settlement is therefore perhaps best understood in the context of small scale, transitory settlement in the area, perhaps associated with food getting and with a few other asks undertaken in conjunction with this: a little tool maintenance for example, as well as testing of the locally available raw materials (and rapid abandonment of these materials?). Scrapers and notches hint of some diversity of tasks, but this is hard to interpret.

The different scatters that are presumably present on the hillside may reflect different groups passing through at different times. Shiplaw is an attractive site, and there seems little reason why it should not be repeatedly occupied, as part of many rhythms of movement. Indeed the presence of a leafshaped arrowhead so near to the mesolithic occupation is interesting in this context, even if it does not allow interpretation. Is this just chance juxtaposition or evidence of continuity in the use of the landscape? More speculatively is the juxtaposition of broad and narrow blade microliths evidence of the same?

It appears that Shiplaw was repeatedly visited over a long period of time although we cannot assess the duration of these, presumably, episodic events. Such a visit may have been undertaken as part of a seasonal round of movement, or possibly in the context of a visit to relatives further afield. It is difficult to assess the seasonality of the settlement although, intuitively, a winter visit seems unlikely (although not impossible in better climatic conditions). My feeling is that Shiplaw was not regularly visited, the densities of material do not seem sufficient for this, but it was one of many places where a small family group, or specialised task group might disperse to at certain times of the year, the rather generalised background scatter of débitage testimony to their routines of movement. In any case, not all visits need have been for the same reason, or at the same season.

It would be easy to say too much about Shiplaw, it is a small site and we only have stone tools (and an incomplete although hopefully representative assemblage at that) from which to make our statements. However the site makes sense as the location of a transitory camp, with a small group of people undertaking a small range of tasks, mainly concerned perhaps with food getting and tool maintenance, but also including other tasks, and taking place within the context of other unidentifiable routines.

2.5.5: Acknowledgements

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2.6: Wide Hope Shank

On the 13th June 1998 a small trial excavation of a quarry pit at Wide Hope Shank (NT187449) was undertaken. The aims of the excavation were to establish the character and date of these features and contribute to the development of methodologies for future research, especially with regard to sampling such large, ambiguous lithic assemblages. The site at Wide Hope lies on the upper slopes and summit of a steep knoll at the top of a large hill (Figures 170-172). From the site there are extensive views from the southwest through to the north. The site overlooks the Flemington Burn, which drains into the Tweed via the Lyne. Immediately northeast of the site afforestation has taken place on Crailzie Hill.

The site is comprised of a range of pits, scoops and hollows of differing sizes cut into the slopes of the hill, and a further, smaller group of more amorphous features on the top of the hill (Figures 173-175). On the slopes of the hill are twenty-nine fairly well defined pits and scoops, ranging in diameter from 2-10m. Some features are complex and inter-cutting, and in places low banks of upcast material are present. In general the features are small scale and the features on top of the hill appear to have been dug directly down towards chert and are quite different in character.

2.6.1: Excavation results

Four 1 x 1m box trenches were opened up on a 1m transect over a single well-defined pit (Figure 175). The excavation examined the main break of slope, the presumed centre of the pit and the 'upcast' at the rear of pit: T1 at the front of the pit, T2 in the centre and T3 to the rear (Figure 176). After the initial removal of topsoil the full extent of débitage became clear and small box sections were excavated in T1 and T2. For context information see Figure 187.

In T2 and T3 a layer of silty well-humified peat (**WHS002**) immediately overlay worked material, merging with the upper layers of this (**WHS003**). In T1 it was harder to observe a clean peat layer and interface material was visible almost directly beneath the root-mat (Figure 177). In T3 peat overlay chert only towards the centre of the trench and it seems that peat has preferentially filled the quarry hollow itself.

Towards the rear of the pit (T3) it was possible to discern a clear layer of crudely worked and shattered chert (**WHS004**), presumably upcast of some kind. The mixed deposits of chert in the centre of the quarry pit (T1 and T2) were very hard to interpret, varying in composition both horizontally and vertically (Figures 178-181). A thin band of grey-brown clay-silt with abundant stone inclusions runs through the débitage (**WHS005**) (Figures 176, 179-180). This widens slightly down-slope and seems to be derived slope-wash, presumably from activity above this pit. This suggests that some, at least, of the lithic material deposited as part of **WHS003** did not relate to the primary use of the pit but are also presumably derived from up-slope. This interpretation is strengthened by the areas in which abraded material is found (see below) although with such a keyhole excavation any conclusions can only be tentative. Beneath **WHS005** in T1 and visible beneath peat in T2 was **WHS006**, a brown silty-gravel layer incorporating large amounts (*c.* 50-75%) of chert with lots of small débitage. This layer varies greatly in compaction and in both T1 and T2 overlies **WHS010**, orange decaying in-situ bedrock exposed at bottom of box sections excavated through **005/006** (Figures 178, 181). This bedrock has an irregular surface. Away from the quarry face itself débitage overlies subsoil (**WHS009**): brown silt gravel with abundant small chert inclusions.

Although such a small trench cannot provide definitive results, the pit appears to have developed from quarrying at the rock face itself, presumably removing crude or frost fractured chert to retrieve higher quality material (Figures 183-186). The deposits in the quarry pit are complex, and appear to include material derived from up-slope.

2.6.2: Lithics

Eight samples were taken of the abundant débitage present. Some were sieved in the field, others taken as bulk samples (Figure 188; see below). Samples of **WHS003** were taken from all trenches and sieved in the field at 5mm. Control bulk samples of **WHS003** were also taken in Tr. in order to enable the development of methodologies for future excavations. Further samples were made of **WHS006** in the two box sections excavated. The samples varied in size but over 100kg of material were taken in these samples. This material has been processed to allow basic identification of the character and type of worked material. There was no charcoal present in any sample.

All of the >5mm samples were processed in their entirety and sorted into >16mm and 16-5mm fractions. The total samples were sorted into >16mm, 4-16mm and 4-2mm fractions. This system, chosen for convenience and speed in the laboratory given the equipment available, unfortunately implies that some direct comparisons between the 5mm sieved samples and the bulk samples are not possible, although the differences are minor and do not affect the interpretation of the site. The total samples were sub-sampled in order to facilitate processing this mass of material. The entirety of the >16mm fraction was analysed, a 1,000g sub-sample of the 4-16mm and a 50g sub-sample of the 4-2mm fraction from each sample.

The quarry pits are full of a mass of naturally and humanly shattered chert of varying types. Interpreting these artefacts can be difficult. Whilst clearly worked pieces of chert can be readily identified there is a wide range of material for which it is difficult to assess the reasons for the fracture or flake removal. This is exacerbated by the tendency of low-grade chert to 'shatter' along planes of weakness with no clear bulbs of percussion. For this reason a fairly simple system of sorting the >16mm fraction into 'natural', 'probably natural', 'possibly worked' and 'worked' classes was adopted. Possibly worked material includes a range of fracture types and relatively coarse chert but the fractures are not fresh and lack the formal morphology of humanly struck material. All material was sorted through twice and, in the majority of cases, the attribution of an artefact to a class was relatively straightforward. For 4-16mm it was not as simple to differentiate between natural and probably natural material, and the categories were combined. Material smaller than 4mm was sorted only into 'worked' (*i.e.* fresh fractures) and 'natural' but this division is very crude.

There is a vast range of chert in the quarry pits, from homogenous blue-grey material through to low quality grey or cream as the chert merges into shales. The chert is sometimes clearly bedded, and badly flawed, but some, at least, of the material is of a very high quality. There are also a number of very small pieces of quartzite caught up in the debris from the pits and present in some of the cruder pieces of chert. Presumably there are small quartz inclusions in the material itself. Two distinctive pieces of chert are worthy of note. One is a small black bladelet, presumably of chert but seeming burnt or weathered. The other is a white, rather lustrous, small flake found in **WHS007**, also presumably of chert. These two pieces, alongside a range of discoloured or slightly pink pieces of chert may indicate some kind of burning in the area. It is not possible to quantify the effects of burning on chert artefacts, but discoloration was more common outside of the pit itself than inside. These hints of burning activity are very interesting, but the complete absence of charcoal from the pits suggests that *in situ* burning was not taking place and it is not possible, at this stage, to ascertain the reasons for the incorporation of this material into the samples. It may be that campfires near the pits were more significant than fire settings within the pit.

A total of 2,501 worked pieces of chert >4mm in size were analysed from the samples as well as seven pieces identified during excavation. The assemblage is fairly evenly split between worked and possibly worked material and natural material. Overall some 44.6% of large material and 33.6% of the smaller fraction was or may have been fractured or struck. This difference presumably reflects increased numbers of small natural pieces of chert.

Once sorted into size grades the worked material was divided into standard analytical categories. All >16mm material excepting chunks was then individually catalogued. Flakes within the <16mm fractions were further divided into primary, secondary and tertiary types. The samples are dominated by chunks and irregular flakes with very occasional regular flakes and crude cores or bashed lumps (Figure 189). Much of the material is clearly the by-product of quarrying activity rather than the intended outcomes of these routines. 75% of the >16mm fraction is badly edge damaged and this seems likely to reflect trampling during prehistory. The extent of the edge damage can cause severe problems during analysis as it often resembles crude microlithic retouch. In no case was a definitively retouched edge identified on an artefact but in many instances unusual 'notches' or irregular scraper edges have been formed (Figure 184).

Analyses of the many flakes in the samples give some indication of the character of activity on site. Cortical flakes are very common amongst the larger removals (Figure 190). These vary widely in shape but are often large and chunky, sometimes difficult to distinguish from split pebbles. Cortex is much rarer on small flakes, but is still present in high quantities.

Platforms were observed on 132 flakes in the assemblage and platform evidence further suggests that the material is the remains of preliminary testing and working of chert. Of these, eighty-four (63.6%) were cortical, forty-seven (35.6%) were plain and one, on a blade, may have been deliberately isolated. On many flakes platforms had shattered during manufacture. One reason for the high numbers of cortical platforms may have been the character of the chert itself, which appears to have formed in bands approximately 5cm deep with cortex on the top and bottom. Many simple chunks or flakes appear to have been struck through this chert with cortex to the top and bottom (see Hind 1998, 2000, Berridge 1994). Platform width was recorded for 112 flakes and varied widely although most platforms were fairly large (Figure 191). In part this reflects the striking of blows into a block of chert, aiming to remove the cortex – tertiary platforms are generally smaller.

Two hammer-stones and one unidentified coarse stone tool were also found during the excavations (Figure 186). One hammer-stone is a complete sub circular pebble of mica rich sandstone. It is a little degraded but has one clear hammering end (66 x 75 x 56mm). There is a small fragment of a rolled and damaged spherical quartzite pebble, also presumably from a hammer-stone (54 x 32 x 19mm). There is also an unusual fragment of a rolled quartzite pebble (54 x 53 x 29mm). Finding so many hammer-stones in such a small excavation might imply that hard hammers were very significant in the reduction processes and this would be borne out by the presence of many shattered platforms on flakes. Bulbar evidence is, unfortunately inconclusive due to the irregular fracture of chert, but many pieces would not be incompatible with direct hard-hammer percussion.

The character of reduction is also indicated by the presence of a range of crude bashed lumps, various sized chunks of chert with flake removals taken from them, and the presence of five cores. Many bashed lumps approach informal cores in type. Although none of the cores are classic typological examples all of them indicate some stress on the production of blades (Figures 184-185). *WHS232* is a fine platform bladelet core, with severe problems with hinging terminations and *WHS160* is also flawed but the blade removals terminate to a point. That the cores are failed is interesting, and they might be interpreted as deliberate discards, but this stress on blades is very significant, especially given their comparative rarity in the samples.

2.6.3: Spatial variation

The range of samples taken at WHS enables some comments to be made about spatial variation on the site. These can only be tentative, the excavations were only small, the samples taken are even smaller and the extent of horizontal variation within the quarry pit is unclear.

Unexpectedly, some patterns have been affected by recovery techniques and in Figures 192-196 italicised entries are from samples sieved at 5mm in the field. The proportion of worked material in the sieved samples is much higher than in the bulk samples from the same context: **WHS001** and **WHS003**, and **WHS002** and **WHS005** (Figure 192). In Tr. 1 Lower the picture is clear in the >16mm fraction (23.5% worked in the sieved samples, 10.7% in the total samples) and the >16mm fraction (22.5% to 16% respectively), whilst in Tr. Upper the proportion is clearest in the >16mm fraction (25.9% worked in the sieved samples, 11.2% in the total samples) but not apparent in the >16mm fraction (22.5% to 23.8% respectively). Whilst this variation may reflect micro-scale spatial variation on site it also seems likely that this is in part a product of the different processing strategies utilised. It is notable that *all* the sieved samples have higher proportions of worked material than the bulk samples. This is a little surprising given the policy of total retention of material in the field and implies that a bulk sampling strategy is to be preferred to sieving of material in the field.

Further differentiation is apparent between the proportion of worked material greater than 16mm in these samples (Figure 193). The 5mm samples tend to have higher proportions of larger material, unsurprising given the differential retention of smaller lithics. However the distinction is not absolute, **WHS002** has a low proportion of larger material. These differences are difficult to assess but imply that spatial variation at the micro-scale is significant.

These factors limit the confidence with which some aspects of the horizontal spatial variation in the test pits can be assessed and, in retrospect, the time saved in the laboratory by processing the bulk samples in a different way to the sieved samples was not worthwhile. However, the differences are controllable and do not seriously compromise the assessment of the evidence from these trial excavations and many comments about spatial variation are still possible.

As noted above, waste and débitage dominate the assemblage. However this crude statement does obscure some spatial variation (Figure 194). For the purpose of this analysis a very crude description of the 'quarry face' is made as **WHS002**, **WHS004**, **WHS005**. Cores, although rare, are more frequent in the centre of the pit (**WHS006**, **WHS007**) away from the quarry face itself. Bashed lumps are also rare on or near the quarry face itself. Large chunks are more frequent near the quarry face and to the rear of the pit, perhaps the latter reflecting material tossed to one side. It is difficult to assess these factors, particularly given potential problems with redeposition and the very small size of the samples concerned. However they may suggest that material hacked away from the quarry face itself was tested in the centre of the pit (perhaps also indicated by the high proportion of flakes in the smaller fraction of **WHS007**). This argument receives some support from the fact that primary flakes are also more common near the quarry face itself and in the centre of the pit whilst tertiary flakes are most common in the centre of the pit and behind it (Figure 195).

Differences are also apparent in the condition of the artefacts (Figure 196): abraded material is not common in the centre of the quarry pit itself but is found outside the pit. This is perhaps evidence for later movement of material down-slope. Broken material is found throughout the pit, although it is more frequent in and to the rear of the pit than elsewhere. Edge damaged material is very rare on the quarry face itself, more frequent above and below the pit. These patterns may reflect the results of trampling in the area.

2.6.4: Discussion

The small-scale excavations at Wide Hope Shank have been a considerable success. Although the features are still not dated a number of insights into the character of activity in the area have been established. The majority of the material in the samples is, strictly speaking, non-diagnostic and no material suitable for radiocarbon dates has been obtained. Notwithstanding this, the presence of bladelet cores might be seen to be evidence for a mesolithic or possible early neolithic date for this activity and, given the comparative abundance of mesolithic as opposed to neolithic activity in the region it may be that these features are mesolithic in date. Such a conclusion can only be tentative, and further large-scale excavations are required in order to elucidate these relationships.

The excavations have allowed us to gain a closer understanding into processes of extraction. There is little evidence for fire-setting to the faces, instead the majority of work appears to have involved striking material from the outcrops themselves, presumably with hard hammers. The quarrying appears to have aimed to isolate high quality chert from frost fractured and weathered chert nearer to the surface. With such small keyhole excavations it is difficult to assess the duration of quarrying activities in any one pit. The extent of edge damage and broken artefacts implies that some considerable degree of trampling was a factor, but in the absence of experimental work this is rather difficult to interpret. Some preliminary testing of material appears to have taken place within the quarry pits themselves, but it is very likely that further preparation and testing took place in the area and that the site is a very complex palimpsest.

2.6.5: Acknowledgements

I am very grateful to Bill Finlayson and Bob Knox for assistance during the excavation and to Lady Matheson for access to the site.

Appendix 3: The microlithic industries of the Tweed Valley: a reappraisal

The microlithic industries of the Tweed Valley are an important resource for the interpretation of the mesolithic settlement of Scotland. Since the late nineteenth century the Tweed has been recognised as providing valuable hunting grounds for collectors and many large collections exist. However many objects are now lost, and those filling cupboards in a variety of museums are problematic archaeological resources. Notwithstanding the problems associated with the representativeness of these collections (Gardiner 1987), the material is mainly from surface contexts and is undated. The only known presumably contemporary archaeological features discovered with mesolithic stone tools are those from small trial-trenches at the Popples, Manor Bridge (**App. 2.3**), but their interpretation is difficult. The only carbon dates associated with lithic material also come from the upper Tweed. A still unpublished small assemblage from Meldon Bridge should be associated with carbon dates of *c.* 4250 BP although the lithic assemblage, which includes microliths, is mixed and partially redeposited (Burgess 1976, Speak pers. comm.). The unenclosed platform settlement of Green Knowe included chert cores and scrapers dating to *c.* 3200 BP (Jobey 1980).

The variety and character of lithics in the Tweed industries is notable: Callander described the lithics as Tardenoisian (1927) but Lacaille criticised this interpretation, referring to upper palaeolithic, Tardenoisian and mesolithic aspects of 'non-geometric, geometric and mixed' collections from the valley (1954: 163-5). Mulholland argues that there are few differences *between* sites in terms of microlith typology (1970: 93) but could find 'no single continental industry ... (which) possesses parallels for the entire assemblage of the Tweed valley mesolithic' (Mulholland 1970: 105). The distinctive character of the assemblages was connected to the raw materials available; mainly pebble flint as well as local cherts, chalcedonies. Lacaille argues that the 'Upper Palaeolithic aspect of these industries would certainly have been emphasised if larger basic flakes and blades could have been extracted from the raw material available' (1954:163; also Mulholland 1970:87). All too often typological approaches conceptualise manufacture, and consequently the influence of raw material types, in inadequate ways and explanations of the diversity of the Tweed industries must be prepared to move beyond the size of pebbles available. In the Tweed some of the variety may be chronological, although I also believe that variation is a more mundane part of later mesolithic industries than normalising typological analyses often allow. We must avoid synchronising diverse lithic scatters and creating units of analysis that may be inappropriate. Indeed, individual sites seem to have stronger parallels with other areas than the industry as a whole. Lacaille links Dryburgh with northern English material (1954: 165) and Mulholland links Kalemouth with northeast England (1970: 97). Parallels and differences between sites in the region can also be identified (see below). Chronological differences are certainly significant, and some sites are very distinct from others, for example Craigsford Mains (see below), where a large part of the assemblage is arguably early mesolithic in date.

The most detailed analysis of the Tweed Valley industries presently available is Helen Mulholland's 1966 dissertation, published in a condensed form (Mulholland 1970). Several undergraduate dissertations are also available, but these are all unpublished and of varying standards: Airhouse Farm (Clarke 1984), Rink Farm (Haley 1990) and samples of Elliot's collection from Kalemouth, Springwood Park and Dryburgh Mains (Wadia 2000). Wickham-Jones' (n.d. a) study of Springwood Park is also awaiting publication. Today, Mulholland's typological and qualitative study is a problematic resource, outdated after thirty-four years of disciplinary change. Yet in the absence of alternatives it still forms an axiomatic part of interpretations of settlement in the Tweed. Halliday accepts Mulholland's 'nine' major sites (1995: 23) and Dent and McDonald's account features an almost unchanged distribution map (1997: Fig. 13). Many of Mulholland's grid references are derived from place names on a map, and some are apparently erroneous. Her grid reference for Newsteads for example falls on the upper slopes of Eildon Hill North (NT53SE 55). Of course, in many instances Mulholland was reliant on problematical data and for some sites we can still do no better than discuss finds at crude levels of accuracy.

The most fundamental problem with the archaeological reality created by Mulholland's text in a modern archaeological environment is identifying which of the sites she discusses are actually mesolithic. She catalogues ninety-four sites (1970: Fig. 2) many of which are now registered in the NMRS as mesolithic on this basis. However she states that microliths are only known from fifteen of these sites, of which three have only one microlith (1970: 93). It is likely that many of the other sites are not mesolithic, as the artefact types she discusses are not diagnostic; for example copies of neolithic arrowheads in 'microlithic technique' (1970: 92). She discusses or illustrates microliths from thirteen locations: Airhouse Farm, Clackmae, Craigsford Mains, Crumhaugh Hill, Dryburgh Mains, Eskdalemuir, Fairnington, Kalemouth, Rink, Slipperfield, 'Tweed-dale', Westside, and Whitrighill. Unfortunately, Eskdalemuir, Slipperfield, 'Tweed-dale' and Westside do not appear on her distribution map, further complicating the issue.[4] Mulholland's sources were varied, including museums (NMAS, Hawick Museum and Dumfries Burgh Museum) as well as a wide range of collectors: J Cherry, JW Elliot, J Forsythe, F Lillie, C Martin, WD Mason and A Robb (1970: 110). Her quantified analyses are based on museum material but her observations take into account 'the much larger body of material in the hands of private collectors' (1970: 93). In many instances it is no longer possible to track down the material she discusses, a situation exacerbated by her failure to identify museum artefacts by catalogue number. Therefore it is impossible to verify her statements. I have analysed material in Hawick, Perth, Selkirk, the NMAS and the Hunterian and it has been possible to disprove *some* statements (see for example **2.1**), but in no instance is it possible to state definitively that a site is or is not mesolithic. For example, the only material on the LSPD from Shiplaw, listed as one of Mulholland's mesolithic sites, is a grey flint thumbnail scraper from the G Leslie collection (NMAS: BMA 2253). The artefact is probably later prehistoric. However recent survey and excavation has led to the identification of a mesolithic site at Shiplaw. Further large unanalysed microlithic collections from the Tweed, such as the James Roberts collection held in Perth, highlight the real problems with the data set. Figure 18 lists all known microlithic sites in the Tweed Valley and Figures 16 and 17 the distribution of these, and of all claimed mesolithic sites. It must be highlighted that these maps are provisional and incomplete, but the distribution does allow generalised interpretations. In the discussions that follow known microlithic sites are identified by an asterisk if the context of discussion does not make it clear.

It is impossible to give a non-qualitative account of the mesolithic settlement of the Tweed Valley. Here I offer a 'site-by-site' narrative, journeying up the valley. Although I will comment on typological matters my concerns are not strictly typological, but are to show the diversity of material and the character of landscape use that may have generated these scatters. Introducing the material in this way also has the advantage that it allows sites and the landscapes around them to be re-embedded a little. Rather than describing a topographical area and then inserting the humans we can look in very crude terms at the

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[4] Slipperfield Loch is in West Linton, Tweeddale but the two sites are not coterminous as they are both listed on Mulholland's Figure 10. Westside is 'near Peebles' but unlocated (NT24SE 26) the two 'pygmies' are now in the NMAS.

relationship between types of sites and the landscape. Of course, many biasing factors are significant in our present understanding of the Tweed sites (Ch. **2**) but a narrative is possible and the models developed in Ch. **3** should be held in mind. The study area is only broadly defined but extends from Kelso in the east to Drumelzier in the west. My discussion of the middle valley sites is more extensive than that of the upper valley, where the sites are reviewed in **App.1** and **2**. The location of the main sites is indicated on Figure 67.

3.1: Mesolithic settlement in the Tweed Valley

> 'Th(e) wide variation of natural landscape (in the Tweed) provides a habitat for an astonishing number of birds and animal' (Omand 1995: xiii)

Some general comments have been made about the location of Tweed valley sites: Callander, for example, discusses 'quite a number of localities' both on haughland and further away from the river: Cleckmae (presumably Clackmae) Craigsford Mains, Fairnington, Fens, Smedheugh, Selkirk, Westruther, and Whitrighill (Callander 1927: 326). Lacaille notes that 'as a rule the relics have been found on the low ground near the rivers' (1954: 163), and Mulholland also argues that the majority of the sites are on sloping ground close to a river or burn (1970). Mulholland discusses post depositional sedimentation on the valley floors but offers no detailed statements (1970). The relationship of these sites to the river terraces is of some importance. Most reconstructions have assumed comparative stability in the profile of the river Tweed. Excavations at Rink Farm (**App. 2.4**) demonstrate that there is good reason to believe that reality is much more complex although creating large-scale models is still not possible. At Rink early Holocene land surfaces are either absent, or deeply buried in the lowest terrace, and artefacts from the lowest terraces at Rink are in derived colluvial deposits. Higher rises above the rivers do appear to have been significant but variation appears to have been common.

3.1.1: Springwood Park and region

A wide range of collections are known from a number of locations within Springwood Park. Flint cores and an end scraper were found among an extensive scatter at NT7211337 in 1964 by CJM Martin, and CH Marshall; whilst concentrations of hollow and thumbnail scrapers, microliths, a bronze age arrowhead and broken knife-blade were found in Springwood Park by GF Lillie (NT73SW). P Wilson records finds from cNT720333 in the 1980's (LSP data) and a collection from Mr Walter Elliot was donated to the author in 1998. An assemblage of 2,279 redeposited lithics found during excavations of a medieval site at Springwood Park has been analysed by Wickham-Jones (n.d. a).

Regular flakes dominate the collection examined by Wickham-Jones (Figure 330), although it is possible that the apparent under-representation of tool manufacturing waste is a product of collection (Wickham-Jones n.d. a). The material is dominated by chalcedony, with chert and flint significant and Arran pitchstone is also present (Figure 331). Wickham-Jones argues that flint pebbles are available in local gravels although it is not clear what deposits she is referring to. She also highlights the presence of black flint with a chalky cortex that must have been obtained from elsewhere. Pebble sources are also adduced for the chert and chalcedony, although some of this material is also argued to have been quarried.

Despite the dominance of regular flakes in the assemblage as a whole, production evidence from Springwood is dominated by blades. Many of the ninety-six cores are classic blade cores and there is careful core rejuvenation evidence. Wickham-Jones notes that cores are worked until very small, abandoned with an average length of 23mm (the eight cores examined by Wadia averaged 22mm in length). Bipolar cores are also present. All cores adequately represent the range of raw material utilised. It is not possible to assess the types of percussion utilised, although most flakes have small platforms, noticeable percussion bulbs and careful preparation is evident. There are only a small number of blades, but flint is disproportionately represented (29%). It is possible that some blades were deliberately snapped.

118 (5.2%) artefacts were retouched. Scrapers are the most common (n=44). Most are convex, although three are concave, and end scrapers (13) and those blunted on two sides, or thumbnail scrapers (n=20) are common. Flint and chalcedony were utilised for scrapers. Awls (n=6) and burins (n=2) are also noted. Twenty-eight microliths were present, including both narrow blade (4-5mm, n=5) and broad blade (10-17mm, n=21) examples. The former include a rod, a crescent and two scalenes: the latter, lamelle à cran, obliquely blunted pieces and microburins but are dominated by truncated or broken pieces.

Wadia (2000) discusses a biased sample of 113 pieces from Springwood, of which sixty are retouched.[5] The raw material is dominated by flint (70%) with chert (17%) and chalcedonies (12%) also present. The flint is mainly grey or honey coloured, presumably derived from pebble sources but includes 'a few pieces' (2000: 7) of dark grey or black material. Many of the retouched pieces are fragmentary, and strictly unclassifiable, but a range of edge retouched flakes are significant. Scrapers are the most common type (n=22). All scrapers are convex, with nine end, two thumbnail and five with working along two adjacent sides, most showed signs of use: this is quite coherent with the types discussed by Wickham-Jones. Twelve microliths are discussed, of which four are broken, the remaining 8 are all narrow blade types, with five backed bladelets and three possible arc blunted crescents. Two bifacially worked pieces are noted. Wadia's analyses are generally comparable to Wickham-Jones', although slight differences in raw materials and microlith types should be noted.

Mulholland argues that Springwood is a major site but does not appear to have made extensive analyses of it. She notes two neolithic pieces and two 'core tools', both held privately. She illustrates these two core tools, two irregular notched artefacts, blade cores and core rejuvenation evidence and comments on a 'recently discovered' partially perforated macehead from Springwood, illustrating a fragmentary countersunk hammerstone (1970: 93; Fig. 4 it is possible, if doubtful, that these two are the same artefact).

Springwood Park sits to the south of the River Teviot, approximately 1km southwest of the present junction of the Teviot and the Tweed. Artefacts have been recovered from a number of fields on the farm but the main concentration is from a field on gentle slopes above the river, overlooking the racecourse, and separated from the lowlands by steep banks that incorporate a spring. Mulholland (1970: 81) states that 'material is collected on the entire slope, including the foot, of a steep bank but not in the valley bottom immediately adjacent to the bank; this would suggest a considerable accumulation of material subsequent to post-Mesolithic erosion'. Mulholland identified six concentrations, 20-30 square yards in size on site, and undertook trial excavations although no archaeological features were identified. These were presumably on the site itself, the flat terrace above the steep bank. This is the location of the redeposited assemblage from medieval contexts discussed by Wickham-Jones.

The site at Springwood has clearly undergone extensive disturbance, partly redeposited into a medieval site, partly slipping down slope. It may originally have had a series of discrete foci but without a clearer understanding of the post depositional processes involved it is

[5] The material donated by Elliot included an ice-cream box of mixed material (mainly unretouched) from *both* Springwood and Kalemouth.

difficult to assess the importance of this factor. In a general sense the lithic assemblage is varied with some mixing but is dominated by mesolithic material. The retouched tools are fairly varied, dominated by varied scrapers and with burins and awls present and a range of microlith types are also noted. The variation between the broad blade dominated assemblage examined by Wickham-Jones and the more narrow blade assemblage examined by Wadia is interesting but does not allow interpretation. The presence of one (?two) ground stone tools and possible waisted pebbles (Elliot pers. comm.) is interesting. If mesolithic these are further evidence of the diversity of tasks undertaken at Springwood. There are a number of hints in the raw materials of connections to outside the region although these do not allow of resolution.

A number of other sites in the region are known, but few details are available. Mulholland or the LSP list Blakelaw, Graden*, Hoselaw, Lempitlaw, Lurdenlaw and Sprouston to the south of Kelso as mesolithic and activity is also noted at Lochside (or Lochtower) on Yetholm Loch. These sites presumably indicate some kind of activity in the rolling hills to the north of the Cheviots although it is difficult to characterise this. Tipping (1996a) has shown evidence for forest clearance post-dating 4500 cal BC at Sourhope and Yetholm Loch (**4.2.2**). Mulholland also cites Stickhill and Lochton, to the north of the Tweed, but no details are available.

The environment of the area is likely to have been fairly rich and varied. Kelso sits in the lowlands of the Tweed, just at the edge of the Merse, among high quality agricultural land. The topography is dominated by northeast trending drumlin deposits from the last glaciation, overlying Devonian and Carboniferous deposits. The soils of the area are mainly brown forest types developed on fluvio-glacial gravels or carboniferous drifts We know little in detail of the environmental history of the area. A series of pollen cores from the Cheviots, to the southeast (Tipping 1996a), indicate considerable edaphic and topographic variety in the composition and developmental chronology of woodland. The generalised vegetation history is of development from birch and hazel scrub through varied woodlands through to oak-hazel-elm forest, dominant in the Merse by *c.* 5000 cal BC (Tipping 1996a: 20) with alder becoming significant after this date, but this general pattern conceals important variation. In the Bowmont, for example, oak was not significant in birch and hazel woodlands. The Merse is likely to have maintained some of the denser woodlands of eastern Scotland but at Kelso and to the west the presence of fluvio-glacial features (Gillen 1995a: 17; Rhind 1968: 122ff) may have made for a more diverse environment. Despite this potential variety it is notable that the environment of the Kelso region is likely to have been more homogenous than the landscapes to the west, as the topography becomes more broken and the impact of deglaciation more notable. The junction of the Teviot and Tweed is also one of the most famous salmon pools on the Tweed.

During the mesolithic Springwood sat near an important river junction, at the edge of some of the larger, denser woods of the region. By the later mesolithic these woods may heave included oak, hazel and elm. Springwood itself may have been a repeated focus for activity, or a longer-lived settlement. In any case, the range of tasks undertaken on site seems to have been quite varied. The other sites in the region have presumably been generated through some kind of more extensive use of the landscape although the character of this remains opaque.

3.1.2: Kalemouth and the Teviot

The other large site known in this area is Kalemouth, on the River Teviot. A range of collections have been made from site including those of Munro, Forsyth, Wilson, Mulholland and Elliot. Wadia, Mulholland and the author have examined samples of these.

Wadia (2000) analysed 105 pieces from Elliot's Kalemouth collections. These included fifty-three retouched pieces and the collection is clearly not representative. Flint was the dominant raw material (52%) with chert (32%) and chalcedony (16%) also significant. Twenty-four 'narrow blade' microliths are recorded, of which ten are classifiable (Figure 274), including three single and three double-backed bladelets (rods) and four crescents of varied types. Scrapers were also significant (n=14) with convex end scrapers, side scrapers and side and end scrapers being the most common. A leaf shaped arrowhead on grey flint and a heavily retouched scraper indicate some neolithic activity. Mulholland identified three neolithic pieces from Kalemouth (1970).

Mulholland illustrates a wide range of artefacts from Kalemouth: a 'heavy tool', burin, piercer, knife, variety of notches and scrapers, including a concave example and a very small convex scraper as well as complex, end and side examples (although disc scrapers are argued to be the dominant type), four large flakes retouched to a point, ('weapon points' or copies of neolithic arrowheads [1970: 92]), a variety of microliths and other varied 'unspecialised forms'. Microliths illustrated include broad and narrow blade types (Fig. 10: #120) and a broad range of microlith types are discussed, including larger isosceles triangles. Scalenes were the most numerous and butt trimmed forms are also present. Mulholland also records the presence of a serrated blade, five burins and 'adze like objects' (ibid. 91). She differentiates the Kalemouth assemblage from either Rink or Dryburgh, suggesting that the latter sites are earlier in date.

A number of artefacts from Kalemouth in the Forsyth collection held by the NMAS were analysed by the author. Many of these artefacts are identified as Kalemouth only, but two smaller collections are identified as Kalemouth 1 and 2 (Kal1, Kal2). Although it is not possible to verify it seems possible that the sites of Kal1 and Kal2 reflect two of the foci discussed by Mulholland (see below). Kal1 includes 118 artefacts (NT713216) (NMAS BMA2650-2672, my ref. KAL1001-1118), Kal2 141 (NT712216) (NMAS BMA2673-2688, my ref. KAL2001-KAL2142). The most striking aspect of the Kalemouth industries is their use of raw materials (Figure 271), and in particular chalcedony which is seemingly derived from a pebble source. Mulholland highlights the presence of imported flint. The composition of the assemblages varies slightly, and the retouched components of Kal1 are more irregular than those of Kal2, especially in terms of scrapers, but the assemblages are broadly compatible. The assemblages include a range of microliths, isosceles and scalene triangles, crescents and truncations. Cores include high quality opposed platform blade cores but vary greatly in type. The general data in the NMAS acquisition lists for Kalemouth records very high numbers of cores, 129 from a total assemblage of 419, and this must be considered to be a product of collection. Ninety-nine of these cores are said to be chalcedony, twelve jasper, nine quartz and two mudstone, and although there are problems with this sample this may indicate interesting raw material use.

Kalemouth sits at the junction of the Teviot with the Kale Water, which flows northwest from the Cheviot massif, and provides an important axis of communication to Yetholm and the Bowmont. The artefacts have been recovered from sloping fields (Elliot pers. comm.) and Mulholland recorded eight artefact concentrations each covering twenty to thirty square yards at the foot of a steep slope running down to Kale Water (Mulholland 1970). It is, again, difficult to assess the context of these finds without further fieldwork. The site is apparently large and varied in character, with a wide range of tool types and interesting use of raw material. It is arguable that Mulholland has underestimated the quantity of neolithic material on site, for instance saws, weapon heads and some of the scrapers illustrated. In any case, with such poor knowledge of the spatial distribution of material it is difficult to interpret these diachronic factors in terms of continuity or juxtaposition.

The environment of the Kalemouth area is likely to have been, in a broad sense, similar to the Springwood region. Kalemouth sits amid rolling glacial topography, as the ground begins to rise to the southeast to the Teviot. The Teviot flows through a broad valley, and this area is good agricultural land; relatively dense prehistoric woodland is likely. Further upstream of Kalemouth Mulholland records a series of sites on the Teviot including 'major' sites at Crumhaugh Hill and Whitchesters. The former is a mixed assemblage, with over 50% neolithic material, and includes (*c.* 10%) chocolate flint and Arran pitchstone. Triangles and rods are recorded in the LSP database and an undiagnostic 'truncated blade' is illustrated by Mulholland (1970: Fig. 13: #232). Few details are available for the latter site and two flared convex scrapers and an unusual (?)microlith are illustrated. Further sites are claimed on and near the Teviot. Mixed collections from Nethertofts and Kersheugh include mesolithic finds and Nisbet, Oxnam and Denholm are recorded as including mesolithic and the latter incorporates pitchstone (LSP). Microliths from Cessford* and Kersknowe* show some activity on rolling hills south and north of the Kale. Four sites are also noted on the Ale Water: Clarilaw, Sandystones, Shawburn and Woodheads. These again point at a more extensive use of the landscape but the details are obscure.

3.1.3: Springwood to Dryburgh

Moving upstream from Springwood along the Tweed, a number of sites are known between Kelso and Selkirk. Lacaille records but does not identify 'some half a dozen minor sites from which (microlithic) specimens have been recovered, principally near the river' (1940: 61) and Mulholland also discusses locations in this area. Microliths form part of mixed collections from Fairnington and the adjacent farm of Muirhouselaw. Mulholland comments that Fairnington includes 'very large tools made in microlithic technique' (1970: 82) and illustrates a range of (mainly large) microliths. Saville comments on an angle backed piece with some Lateglacial characteristics (1999).

Other sites such as Rutherford or Maxton[6] are noted as find spots only. To the north of the river, in the hills rising to the Black Adder Water, Brotherstone, Mellerstain, East Gordon*, East Morriston, West Morriston, Huntlywood,[7] Purvishaugh, Whitefield and Yarlside are all recorded as mesolithic but have not been verified. Microliths from some distance from the Tweed, at Westruther, are identical in type to those from Dryburgh (Lacaille 1940: 61). Further sites on the Blackadder are listed as mesolithic: Cammerlaws*,[8] Eastfield, Greenlaw, Greenlawdean, Hallyburton, and Rumbleton* but no details are available. It is notable that many of these sites, for example East Gordon or Westruther, are some distance from major watercourses.

Mesolithic finds are also known from the Fens, near Dryburgh on the south bank of a meandering Tweed (see below). A collection of 227 flakes and artefacts from the Fens formed part of the extensive Munro collection donated to the NMAS in 1961 (NMAS BMA2758-2763). The collection is chert dominated (69.2%) although flint is important (22.0%). In general the collection has mesolithic affinities, although a relative absence of blades should be noted. Core types vary: cylindrical bladelet cores, single platform bladelet cores, irregular flake cores and bipolar reduction are all present. All cores were small. Four microliths with narrow blade affinities include a range of backed blades (BMB2758, 2759). Other retouched artefacts include burins, scrapers and more irregular forms. To the north of the river here, at Bemersyde, mesolithic artefacts (Mulholland 1970) and many waisted

[6] Mulholland illustrates 4 scrapers from Maxton (19780 Fig. 6: 55, 58, 59, Fig. 7: 63)

[7] Mulholland illustrates an elaborate and invasively retouched scraper from Huntlywood (1970, Fig. 7: 79), probably later prehistoric.

[8] Mulholland illustrates a burin from Cammerlaws, identifying it as a weapon head (1970, Fig. 9: 14).

pebbles are recorded. Mulholland does not illustrate microliths (*contra* NMR NT63SW 37), but burins, notches, and scrapers.

These are increasing diverse landscapes. Soils of the Hobkirk association, derived from Old Red Sandstones dominate as far as St. Boswells and the Eildons, and after this, poorer, and more varied soils of the Ettrick association developed on Silurian greywackes and shales are important. Modern land-use assessments note that the soil deteriorates upstream of Roxburgh and this change in the base rocks may have been significant in the prehistoric landscape. The topography is increasingly broken by low and moderate hills with occasional high summits, most notably, the volcanic massif of the Eildons. The effects of deglaciation are clearly apparent in this area; even after several centuries of improvement the landscape is variable, mosses and muirs feature in many place names and in places bare rocky hills rise. In prehistory the landscape may have been much more diverse with many small lochans and mires. The character of the floral environment is difficult to assess, although some diversity might be expected. Oak was probably significant late in the period, especially on areas of better soil whilst hazel, birch and eventually alder may have been important on poorer ground. Woodland in these landscapes is unlikely to have been homogenous and, it is perhaps not surprising that the records of mesolithic activity in this area are slightly more extensive than further downstream. Indeed sites such as Fairnington and Muirhouselaw are some 3-4km from the Tweed, indicating widespread use of the landscape.

3.1.4: Dryburgh Mains

The largest site in this area is Dryburgh Mains (Dryburgh), one of the most famous of the Tweed Valley mesolithic sites, and unfortunately, one of the most complex and difficult to understand. Dryburgh Mains is the name of a farm, describing a series of haugh lands, presently divided into large fields, lying underneath steep slopes rising *c.* 40m to a plateau. Dryburgh has been a Mecca for collectors since at least the beginning of the century, and the assemblages from the site are vast, often with little or no spatial information. Sometimes different fields in the area are given specific names, but this is not always the case. Monksford Field, for example, sits at the north of the area, near the ford which gives it its name; Chapel, Glen, Low, Orchard and Riverside fields are also recorded.[9] Finds have been made from clay pockets associated with the high plateau at the rear of the Dryburgh terrace, and many more have come from 12" of sandy topsoil overlying terrace gravels. Callander gives some spatial information on the finds, noting that the majority have come from the haugh, where they are widespread, if discontinuous, and from two restricted areas on the upper plateau (1927: 318). It is notable that the river terrace system at Dryburgh is very complex, 'the Dryburgh meander core exhibits terrace remnants which are markedly askew to one another, each one cutting one, two or more higher terraces, this implies continuous shifts of river orientation' (Rhind 1968:139). It is difficult to date these features, and the meander core itself refers to the area underneath the Abbey immediately east of the haughs, but this suggests that some serious attention must be paid to the geomorphic context of these artefacts, especially given the results of recent fieldwork at Rink.

Corrie makes the first published comment on the Dryburgh material, much of which he sold on to figures such as Henderson-Bishop and Mann. He highlighted the quantity of flakes and spalls and the variation in all pieces (1916: 307) commenting on flint, chert and small amounts of pitchstone. Cores had a 'characteristic shoulder', and he argued that flint was brought to site in a prepared form and observed heat treatment of some pieces. Twenty notched artefacts as well as microliths are recorded, as are two barbed arrowheads, one of which was found on the upper plateau. Crude hammer-stones and anvils as well as waisted

[9] Fields centring on NT58523268, NT58563243, NT58833260, and NT58943240 are given in the NMRS

pebbles and countersunk pebbles were also present. Scrapers were the most abundant artefact type (n=62), over half of which were distinctive small round scrapers, less than 0.5" in diameter. These tiny circular scrapers are a distinctive feature of some mesolithic sites in the Tweed, found also at the Dookits (**App 2.1**) for example. Callander (1927) notes that these 'Tardenoisian' scrapers tend to be smaller as well as thicker in relation to their diameter than their neolithic counter parts, and records claystone cores. Lacaille (1940: 67) also comments on the small scrapers and the variety of raw material.

Wadia (2000) studied a sample of material from Walter Elliot's collections from Dryburgh, possibly incorporating material collected by the Mason brothers early in the twentieth century. The assemblage is more representative than the other Elliot collections analysed. including a range of waste and cores, but the almost complete lack of microliths should be noted. Elliot often separated microliths from waste in his collections, and it is likely that these are missing. Wadia recorded 647 pieces, of which sixty-seven were modified. Chert dominated (59%) with flint (34%) and chalcedony (8%) also present. Most of the flint was pebble derived but some dark grey and black flint is recorded as well as six pieces of pitchstone. Alongside many regular and irregular flakes, fifty cores are also present, many of these are irregular and most are small, averaging 25mm in length. Twenty-five blades are present and although the sample is small these are preferentially manufactured on flint (60%). A single microlith, a chord blunted crescent, and many edge-retouched blades and flakes are discussed. Seventeen blades are retouched, of which 82% are flint, hinting again at the preferential use of this material. Scrapers were the most common formal tool, with a variety of convex edges; end scrapers were the most common type. Two unclassifiable broken arrowheads and a heavily retouched scraper indicate some later prehistoric activity. Comparatively few diagnostic later finds have been made (Callander 1927; Corrie 1916). Mulholland suggests there are only fifteen neolithic pieces in this collection (1970) and many of these are arrowheads, easily incorporated as stray finds. Dryburgh would therefore appear to be *relatively* un-mixed with later material, although assessing the extent of mixture within the mesolithic period is impossible. Analyses of core and blade technology indicate the existence of subtle conventions of production at Dryburgh, with routines of bipolar working also significant (**7.4.2.2**).

Mulholland illustrates a range of tools from Dryburgh; heavy types, burins, knives, notches, scrapers, weapon heads(?), microburins, core rejuvenation waste and a vast range of microliths. A total of 227 microliths were known from the site when Mulholland wrote. These are a mixture of geometric and non-geometric types: scalene triangles, rods, crescents (mainly arc-blunted) and trapezes are common, noted for their small size. Larger isosceles triangles and trapezes are also noted. Lacaille links Dryburgh with the classic later mesolithic northern English material (1954:165) and Mulholland believes it is early in the sequence, and comparable to Rink. I analysed parts of the Munro Collection from Dryburgh and the following general observations can be made. Scrapers are common, and variable in type. This is especially true of chert examples whereas flint scrapers tend to be smaller. Microlith types were very varied (Figures 304, 305) including both narrow and broad blade types and include one giant double-backed flint blade of 44 x 10 x 5mm.

Raw materials vary widely at Dryburgh. Pitchstone and dark flint are both present as well as an isosceles triangle manufactured on a very distinctive orange material with red veins, a hematite rich chert (this material is also observed by Wadia). Iron rich cherts are known towards the head of the Leader (Wickham-Jones and Collins 1978). Mulholland comments that 3% of the assemblage is of imported flint.

Dryburgh is difficult to interpret. It is clearly a complex site, probably generated by repeated patterns of occupancy spread over some time. It is situated to the north of the river in a complex meander core, near a ford and good salmon fishing spots, located as the hills begin to rise towards the narrow valleys of the uplands proper. As noted above, although the history of woodland development is unknown the environment of this area is likely to have been comparatively varied. At the largest of scales Dryburgh is situated between land types in the Borders, upstream from the comparatively dense forests of the Merse and downstream of the more broken woodlands of the dissected valleys and hills of the uplands. The landscape immediately around the site is varied, with moderate to low rolling hills and the ridge rising behind the site offers good views across to the Eildons and beyond. At the more local scale it is also possible that a complex meander core of this type may have comparatively unforested, as the river cuts channels and exposes new areas. In this sense it is possible that the comparable collections from Fens and Dryburgh are in many senses part of the same process of occupation of these terraces. Although the general location was comparatively fixed, over time the changing pattern of the river opened some new spaces and closed others. Immediately upstream of Monksford the valley narrows suddenly and the next relatively open space is at Newsteads*, opposite the confluence of the Tweed and the Leader. Behind Dryburgh lie the complex moors and lochans of Bemersyde, a frequent find spot of waisted pebbles.

3.1.5: Lauderdale

A number of very interesting sites are recorded from as far up the Leader as Airhouse. Mulholland argues (170: 95ff) that the Lauderdale industries are distinct from other Tweed Valley sites, and paralleled at Crumhaugh. Distinctive features include the absence of obliquely truncated points retouched only on the truncation, crescents, isosceles triangles and narrower points. The relevance of this claim is dubious; as microliths from Craigsford illustrated by Mulholland *include* oblique truncations retouched only on the truncation (ibid. Fig. 12. #199-205). However one distinctive characteristic of the main Lauderdale sites is their raw material use: although a number of sources of chert and jasper are known in the upper reaches of this valley (Wickham-Jones and Collins 1978), Airhouse and Craigsford both utilise large amounts of high quality non-local flint. In part this may be due to chronological issues, both sites are mixed and neither is dominated by the later mesolithic industries that are so reliant on local chert. In fact neolithic activity in the valley appears to be fairly extensive and it may be significant that Lauderdale is a comparatively shallow valley with high quality soils derived from Old Red Sandstone drifts, and supports a wide range of crops today.

As well as the famous sites of Craigsford Mains and Airhouse Farms (see below) 'Tardenoisian' microliths, including a triangle, as well as countersunk pebbles are recorded from Earlston (NMR NT53NE). Microliths are recorded from Clackmae (Callander 1927, Mulholland 1970), Blainslie (LSP), Legerwood and Muircleugh on the Moors above Lauderdale. Mulholland also lists Birkenside, Bowerhouse, Grizzlefield, Kedslie, Mosshouses, Trabrown (Trabroun), Wanton Walls, and Whitslaid although no details are available. These sites again demonstrate that mesolithic activity was not restricted to the riversides. Finds of waisted pebbles have been made from Park and Craigsford Mains.

Craigsford Mains (Craigsford) is another site with a long history of collection and variable recording and the assemblages from the site are very mixed. 1,667 artefacts are sourced to Craigsford on the NMAS acquisition list and the collection includes patinated and fresh pieces, microliths, microburins, plano-convex knives, halberds, lop-sided and barbed and tanged arrowheads, as well as polished flint axes and saws. Mulholland illustrates a range of tools: fabricators, borers, piercers, notches, horseshoe scrapers, end scrapers, three unusual large weapon heads and smaller examples, and one of the distinctive cores from the site (see below). Microliths are dominated by oblique truncations but a variety of other forms are present. Broad blade forms do dominate, but not exclusively. My observations of the Munro collection in the NMAS (BMA2725-6) are very similar. The microliths are dominated by broad microliths with few classically geometric types, although small microburins are present. These include a distinctive peach coloured flint. Truncations, crescent/trapezes and confident notched artefacts are all significant. Lacaille identified end scrapers on blades (Lacaille 1954:163-165; Fig. 60:5-6) as a significant aspect of these industries.

Of the 1,304 artefacts identified by material in the NMAS acquisition list 95% are varying shades of flint; chert is rare and includes one fragment of distinctive orange material. Although this may reflect collection strategies, the Munro collection from Craigsford is also dominated by flint despite the fact that at all other sites Munro routinely collected chert, chalcedony and quartz. This seems to indicate that the dominance of flint may be real, and that Craigsford is not directly comparable to the other Tweed valley sites. The distinctiveness of the industry is also indicated by the importance of very large broad blades (**7.4.3.2**). Lacaille (1954) noted a long blade tradition, which he suggested was also adduced at Dryburgh, but to my mind Craigsford Mains is distinctive. Many of the cores are also of distinctive types, manufactured unifacially across pebbles leaving a distinctive thin pebble remnant, described by Mercer as an asymmetrically backed core (1970). These cores are present on other sites, but not dominant like this. Mulholland did not identify any conical or cylindrical cores and nearly 40% of all cores identified were flake cores, these cores are often larger than at other sites (Mulholland 1970: Table 1). The number of cores is also low and this is paralleled at Airhouse.

Mulholland argued that this assemblage had '35% neolithic' and it is clear that there is extensive later prehistoric activity in this area, and indeed throughout Lauderdale. However it is arguable that Craigsford Mains is the best candidate amongst the Tweed Valley sites to be early mesolithic in date. Although clearly mixed the industry is distinct from other sites in the region, using distinctive cores to produce very large blades. Despite the presence of large quantities of chert in the area it relies almost exclusively on flint, some of which is of unusual, non-local types. The microlith types also involve many broad blade types and fairly standardised end of blade scrapers are important. These features are all characteristics of early mesolithic industries, closely paralleled at Lussa Bay for example (Mercer 1970). In isolation none would be suitable evidence of an early mesolithic date but in combination they are very suggestive. However it is impossible to interpret the site in terms of activities. It would therefore seem very important to relocate these scatters and attempt to obtain more controlled samples of them. Unfortunately it is difficult to locate Craigsford. One early record discusses 'a spot between the Rivers Leader and Gala - described by Mr Scott as a sharply defined area lying along for a certain distance on the high part of two fields. In this piece of ground there were spots - one especially - where the flints were much more numerous than in outer parts, as if it were a place where flint implements had been manufactured' (Berwickshire Naturalists Club, **XV** [1894-95]: 159) but it seems likely that over the years many sites have been conflated. In a broad sense Craigsford is situated on slopes above a comparatively wide part of Leader Valley, an important tributary of the Tweed providing access to the north. Mulholland gives a grid reference of NT569382 for the site, to the west of the river, near the road and some houses; this suggests that the site is very close to the valley floor. During the early mesolithic the vegetation is likely to have been dominated by light hazel and birch woodlands, with colonising species such as oak and elm only becoming significant at the end of this period. Craigsford is not, intuitively, a dominant location and the site remains somewhat of an enigma. Further up the Leader the complex assemblages from Airhouse offer some comparisons.

A large and complex collection of artefacts is known from Airhouse Farm (Airhouse). This includes some artefacts located at 'Parkfoot', one of three farms now subsumed at Airhouse

(NMR: NT45SE). Callander commented on this industry in 1928, in particular drawing attention to lopsided arrowheads and triangular objects, both would now be identified as petit-tranchet derivative forms associated with the later neolithic or beaker period (Callander 1928; Clarke 1935; see Wickham-Jones 1981 for discussion). In 1984 Mary Clarke of Glasgow University produced an undergraduate dissertation on the lithic industries. She studied 553 registered finds made by the farmer, John R Fortune,[10] in the first half of this century: 'most of the material consists of recognisable morphological forms which in the past have been ascribed to specific chronological time sequences.' (Clark 1984: 8). Some dispute exists about evidence for reduction on site. Callander (1928: 174) argued for local production, Clarke disagrees (1984) although it seems likely that the sample Clarke analyses is biased and that Callander's assessment is preferable.

Flint dominates the collection, ranging from shades of grey, to black to yellow/honey and was generally of high quality (Clarke 1984). All observers have commented upon a non-local rich olive/brown/chocolate flint utilised in arrowheads and other formal artefact types. Chert forms only 3% of the assemblage despite the fact that Airhouse lies less than 3km away from a chert source. Scrapers are often short oval or semi-circular forms, other formal tools included sixty-one leaf shaped points, twenty-two barbed and tanged arrowheads, and thirty triangles.[11] Callander drew attention to the large numbers of utilised flakes (1928). Clarke's analyses recorded no microliths or narrow blades from the site, whereas Mulholland did consider Airhouse to contain a mesolithic facies. Mulholland discusses a borer, a saw, copies of arrowheads in microlithic style (Mulholland 1970: Fig. 3, 15: #89, #92) and a range of microliths dominated by oblique truncations and seemingly short of geometric types. Mulholland argues that whilst over 50% of the assemblage is neolithic (Mulholland 1970:87), 22% of the 'mesolithic assemblage' was made on chocolate brown flint and cites Callander as support for this. Unfortunately Callander's article makes no reference to mesolithic artefacts, and he argues that the people who manufactured the flint arrowheads at AF were later than the chert-using 'pygmy' makers (1928).

Notwithstanding difficulties with assessing the mesolithic component of this site, Airhouse Farm is a rather interesting collection, not least for its evidence of later prehistoric activity. Over 150 petit-tranchet arrowheads and at least forty other arrowheads (Callander 1928) normally dated by association to the later neolithic have been found from the site. The production evidence is troublesome, but the hints we have might suggest that little production happened on site. Alan Saville noted that these 'extraordinary' concentrations of fine artefacts suggest parallels with Irish arrowhead hoards (Saville 1994a: 66, note 6). Finds of these arrowheads are also recorded from the Overhowden, the next farm to the south. A henge is known at this location (Mercer 1981:119). Associated with these finds are a heavier, flint dominated, industry with many small short convex scrapers. As well as these interesting hints of later prehistoric activity it is notable that the blades analysed by Clark are very large, seemingly paralleled only at Craigsford Mains. In this sense it is interesting that Airhouse is also dominated by flint and by end scrapers and has typologically early microlithic referents.

[10] Other collectors known to have operated at this sire include W Brown, J M Corrie, T Readman and T Scott (LSPD).

[11] Caution must be taken with these figures, Clark mixes bi-facial, uni-facial, steep and non-retouched arrowheads and spear heads in this category (1984). However the dominance of formal retouched arrowheads is real, see Callander 1928 for more details)

3.1.6: Rink

Back on the Tweed a number of sites are identified between Newsteads* and the next major assemblage at Rink. The main valley here becomes increasingly narrow, and much of it is now urbanised. Mulholland lists Bowden, on the rolling hills to the south of the river, and Glendearg, a farm in the valley of the Allan, a small left bank tributary (1970). No artefacts are known from the confluence of the Tweed and the Gala Water which is now urbanised, although Mulholland lists two sites on the Gala Water itself, Cortleferry and Brockhouse which are both approximately 20km upstream. No details are available for any of these sites.

Rink Farm is one of the more productive flint scatters in the Tweed Valley (See Figures 27-47). Mason (1931) published an account of 'pigmie' flints at 'Tweed Bridge' observing that thousands of flints had been recovered, including chips and hammerstones alongside 80 'pigmie' artefacts (those illustrated include triangles and rods), barbed and tanged and leaf shaped arrowheads, a stone ball, a bronze pennanular bracelet fragment, a polished stone axe and sinker stones. The LSP records for the site also list stone whorls and jet pendants. We have noted that some of the material at Rink is redeposited. Armand Lacaille notes in passing that Rink is of interest because of its position on a raised knoll, unlike many other mesolithic sites in the valley which 'as a rule ... have been found on the low ground near the rivers (Lacaille 1954: 163).

Artefacts are known from three fields at Rink (Figure 29) Mulholland discusses seven artefact concentrations in the upper fields, 'each of which covers an area of 20 to 30 square yards' (1970: 81). She states that two of these come from the foot of the bank on the lowest fragment and that further finds are made from the steep bank below Field C itself. Mulholland excavated 25 square yards in field C and discovered a layer of large stones at between 10 inches and 2 feet depth, deeper nearer the edge of the terrace. Above this a red-brown sandy soil is recorded, which at a height of two-three feet gives way to a 'fine grained orange soil' (Mulholland 1970:85). It is unclear what relationship this bears to the stony layer. Six flints were recorded from below the stony layer, 153 from amongst it and over 800 from the upper soil (1970:85). She argued that the mesolithic land surface was immediately above the stony layer and that the incorporation of material into the stones was the product of animal activity. The exact location of Mulholland's trench is unknown although photographic evidence (Figure 32) and comments by Walter Elliot suggest that it was near the edge of the terrace towards the centre of the field and the stratigraphy may relate to the Lateglacial terraces in the area (Rhind 1968). Excavations in Field A demonstrate that the artefacts are in a colluvial deposit, and are not *in situ* (**App 2.4**).

Elliot's collection of 8,925 artefacts from Rink Farm was analysed as an undergraduate dissertation (Haley 1990). Haley commented on the fragmentary character of the Elliot collection; a factor he attributed to the storage of this material in ice cream boxes, and recorded the following proportions of artefacts from Rink, demonstrating that the assemblage was dominated by fragmentary pieces (Figures 332-334). He undertook detailed analysis of complete flakes, cores and finished tools. Raw materials were dominated by chert, with flint present; Haley describes chalcedony as agate.

The 146 artefacts recovered during my excavations at Rink provide a useful, if small, control sample from field A (Figure 46). Chert dominates (80.1%) with flint (15.8%) also important in an assemblage dominated by waste. Most of the finds were fresh with just a few (n=7) patinating, and a few (n=2) lightly burnt. Twenty-one artefacts were clearly broken, this must under-represent the true figure as breaks are very difficult to spot on the crude chunks and irregular flakes that comprise the bulk of this collection. Formal artefacts (cores, blades and retouched pieces) were rare: this may reflect the longevity of collection on the site.

Haley identified 122 retouched pieces, with microliths the single most important type (n=50). He argues that microlith types are dominated by rods (52%) although some caution should be taken with a figure that includes a great many broken examples. Mulholland's table (1970: Table 1) is difficult to read, but also suggests that backed blades, rods and sauvetterian points were significant. She argued that Rink may have been an early part of the Tweed lithic traditions. Shorter convex forms, made on a variety of raw materials dominate scrapers, although end scrapers are also significant. In general scraper types are not highly standardised. Mulholland points out that concave scrapers are unknown at Rink (1970:95).

Based on metrical analyses of complete flakes and the formal properties of microliths Haley argues that the site is later mesolithic, with minimal later contamination. Mulholland also argues that the site has 'two' neolithic pieces although the presence of later material, especially 'stray' finds such as arrowheads, is notable. One was recovered during my excavation for example; *RNK151* was a fine, small broken bifacial arrowhead discovered towards the bottom of the colluvial deposits in T2. The presence of pitchstone and serrated blades may also be suggestive of early neolithic activity.

Rink sits on one of the most productive salmon pools of the Tweed at the junction of two rivers. The landscape itself is quite diverse, including numerous ice wastage features and a fairly wide floodplain. It is likely to have been a varied environment in prehistory, a series of well drained ridges sitting above an important river junction with a varied floodplain. Birch and hazel are likely to have been significant although some oak or elm on the better soils of the larger higher terraces is likely. Alder may have colonised the riverbanks and wetter kettle holes. The valley here is comparatively steep, but the fairly wide space at Rink, Sunderland Hall and towards Lindean is notable. Thirty microliths from one field on Lindean Farm, and others from nearby are noted by Mason (1931) and probably indicate a more extensive use of this important landscape. Flints are also recorded from Sunderland Hall (Rhind 1968) and this may include microliths.[12] The indications are of an extensive use of this region.

A number of sites are known on and above the Ettrick and its tributary the Yarrow. Mason (1931) discusses a range of sites, of which two are clearly microlithic, South Common Farm*, where finds were made in the lower part of a field near the racecourse and in association with a possible old lochan. Pitchstone is also known from this area (Elliot collection). Microliths are also recorded from fields overlooking Haremoss Loch*, a small lochan on the hills above the Ettrick, near the upper waters of the Ale. Smedheugh* located on hill tops above Selkirk, is discussed by Callander in the context of Tardenoisian types and microliths from the site are in Perth Museum, waisted pebbles are also known from the site. Microliths from Whitlaw* and Clarilawmuir* are also in Perth, possibly indicating fairly extensive use of the area. Mason comments on his finds that 'all farms .. occupy the bleak moorlands to the south and east of Selkirk ... and present the same features of bare hill tips broken here and there by little marshes or lochs' (1931: 114-5). Most of these sites are likely to have been at over 200m OD, Smedheugh may be at nearly 300m OD. The valleys and hills themselves are increasingly steep, although wide areas are present. The Ettrick broadens at the confluence with the Yarrow, and a range of microliths and later material are known from Philiphaugh here. The soils (Ettrick association) of this area are generally poor, derived from greywackes, and woodland is unlikely to have been dominated by large oaks and elms although they may have been significant in lighter fluvial soils in the valley bottoms.

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[12] Microliths in the Roberts collections, Perth Museum are labelled 'Sunderland'. Roberts collected extensively in this area.

Further up the Yarrow Eldinhope*, Henderland* Kirkstead, Mountbenger, St Mary's Loch Summerhope* and Yarrow* on the Yarrow Water are high up in the Southern Uplands and hills rise steeply on all sides of these narrow valleys. St Mary's Loch itself is deep within the mountains at *c.* 250m OD although the potential attractiveness of this site should be noted.

3.1.7: Rink to Manor Bridge

Returning to the Tweed, fewer sites are found upstream of Rink in an increasingly narrow valley. Mesolithic flints are recorded from the 'River Tweed' at NT462325 and Minch Moor (LSP) but no details are available. A range of microliths from Ashiestiel are held in Perth Museum (Mulholland 1970, also RCAHMS 1957) and flint and chalcedony microliths are also known from Orchard House, near Innerleithen and from Minch Moor* above here.

Mulholland illustrates microliths from 'Westside', an unknown location near Peebles. More sites are now known near Peebles, mainly due to fieldwalking carried out by Bob Knox and recent small-scale fieldwork (**App.1**, **App.2**). 146 artefacts were recovered from in surface contexts in Cavalry Park, on a low river terrace near Peebles (Figures 197-201). The collection includes two geometric microliths as well as convex scrapers and a range of crude production evidence related to the testing and exploitation of riverine pebbles of chert. A fragmentary triangular microlith was found on the slopes of Kittlegairy hill, above the Tweed at Peebles (KNX0833, *c.* 300m OD) and an unclassifiable chert microlith was found on the Crookston Burn, to the south (Figure 324). Blade cores of characteristic types are also found at Jedderfield, although no diagnostic artefacts are present.

It is difficult to interpret the site at the Dookits, a rocky outcrop on the north bank of the Tweed rising above a large pool (Figures 251-261). 150 lithics were recovered from excavations and surface collections at the Dookits (**App 2.1**) including narrow blades, a few cores and a range of diagnostic retouched pieces. These include broad microliths, a range of very small scrapers and a burin. Interestingly the industry is not technologically directly comparable to that at Manor Bridge (**App 2.2**), only 2km upstream. Soon after the Dookits a microlith and blade scatter is known from the haugh lands beneath Neidpath castle, a likely spot for a gatherer-hunter settlement, and it is possible that this material is derived from this much-disturbed location. These sites all suggest some degree of activity near the confluence of the Eddleston and the Tweed in a broad area of the valley whose base is now at 200m OD although it is difficult to assess the character of this. The Tweed exits the steep Neidpath Gorge at Neidpath, entering just before the junction of the Tweed and the Manor at Manor Bridge.

A number of sites in the Eddleston valley are listed by Mulholland, but no further details are available for Eddleston, Darnhall, and West Loch.[13] A mesolithic site has recently been identified and partially excavated at Shiplaw (Figures 58-66, **App. 2.5**) on slopes immediately north of the Shiplaw Burn. The hill is covered in a low-density scatter of stone working, much of it seemingly mesolithic in date, with a small concentration notable. The main concentration is less than 10m in diameter and sits on a low knoll on south facing slopes above a burn overlooking a complex and undated terrace system, a 'classic' location for gatherer-hunter sites in the Tweed valley. The stone tools from site show evidence for structures of stone tool crafting extending across the landscape as a whole, for example the curation and careful rejuvenation of cores. This, and a range of tertiary débitage, is suggestive of tool maintenance and manufacture rather than stone tool procurement (although the situation is a little fuzzy). The settlement is therefore perhaps best understood in the context of small scale, transitory settlement in the area, perhaps associated with food

[13] Recent surface scatters recovered from Darnhall by the Peebles Archaeological Society are undiagnostic.

getting and with a few other tasks undertaken in conjunction with this: a little tool maintenance for example, as well as testing of the locally available raw materials (and rapid abandonment of this materials?). Scrapers and notches hint at some diversity of tasks, but this is hard to interpret. Microliths include both broad blade and narrow blade types, although as the sample is small, this is difficult to interpret.

A short distance to the west of Shiplaw, the landscape opens out a little and is characterised by rolling loch and lochan topography. Undated pollen cores are available from Upper Eddleston and the Moorfoots (Newey 1967) and add some detail to our understandings of the early Holocene landscape of the area. Birch was the first coloniser with hazel rapidly becoming significant through the Boreal. Elm and later oak appears at the traditional transition from the Boreal to the Atlantic but may never have been very significant in these landscapes, whilst alder rapidly became significant in this fairly woody but damp environment. The soils of the area are varied, and the diverse topography of the Eddleston and its tributaries provided a rich, diverse and fairly wet landscape throughout the early Holocene. A loch and lochan topography would probably have been very attractive to a range of birds whilst the larger rivers in the area used to carry many salmon. Further west the valley sides rise to hills with outcropping chert and finally, the valley is on a major communications axis from the Uplands of the Tweed to the Forth to the north.

3.1.8: Manor Bridge and upstream

Small-scale excavations at Manor Bridge have revealed not only mesolithic artefacts, but also a range of archaeological features (Figures 211-250, **App. 2.3**). The excavated site is split into two parts: firstly a small area of a rock outcrop immediately to the north of the River Tweed, locally known as The Popples, and a ridge above this site, in a field in rough pasture. The connection between the two areas is unsure, although the distribution of artefacts is almost continuous and they are all of similar types. Interestingly the ridge 'cow field' site has higher proportions of chunks and cores and fewer regular flakes or blades, and the outcrop nearly all of the scrapers.

The test pits focused upon the extreme west of the Popples. This was the area of the greatest concentration of surface finds, which focused on the flat surface of the outcrop but were also found at the river side and in erosive contexts leading down from the outcrop. This distribution may be a product of the extent of modern day gorse cover on the site. Small 1 x 0.5m trenches were excavated, and as a consequence the interpretation of the site is difficult but it is clear that deposits of sand, presumably derived from upslope, have sealed several mesolithic features at a depth of about 50cm. Manor Bridge is therefore a unique zone of preservation in the Tweed valley, and is of considerable importance. A pit was identified, although its size could not be determined in trial trenches in disturbed soils. It contained burnt hazelnuts, charcoal and calcined bone as well as lithics and fire affected rocks. An enigmatic stone setting associated with lithics was identified in another pit. Above the outcrop the artefacts in the 'cow field' were found in plough soil overlying variable till and gravel subsoil. The largest concentration of artefacts came from well-drained areas, close to the break of slope itself and with good views back across to the junction of the Tweed and the Manor.

A total of 897 artefacts from Manor Bridge have been analysed. The materials utilised at Manor Bridge were dominated by chert, which comprised 82.7% of the artefacts collected. Flint was an important resource (11.5%) and other materials included chalcedony, agates, and some coarse mudstones. The assemblage includes lots of production waste as well as formal tools and regular removals (Figure 235). Formal cores were important and these may have involved the use of indirect percussion and possibly the use of clamp to hold such small cores. Other reduction techniques were also utilised although the general absence of bipolar knapping is of interest. The reduction technology aimed at the production of regular flakes and especially blades. Flint was preferentially utilised for the production of longer blades and flakes, and more effort was expended on the production and preparation of items from this raw material. Microliths are irregular in type, and preferentially manufactured on flint. Scalene triangles, crescents and single backed blades are significant, these latter mainly seem to be retouched on only one side (*KNX0176* is an exception). Microburins are also present. A number of fine formal scrapers as well as more irregular forms are important including end of blade types, steep short convex scrapers and some larger examples.

At Manor Bridge the Tweed is joined from the south by its tributary the Manor Water. The river is some 20-30m wide at this point and is bounded by low floodplains to the north and south. The river junction is a very popular late summer and autumn fishing point. The valley itself widens out after Manor Bridge although the hills are still steep and bedrock is frequently near the surface. Manor Bridge is an interesting site, a varied assemblage of artefacts with interesting spatial patterns. The presence of pits and various items of 'camp furniture' is suggestive of something more than a transitory presence but it is difficult to assess this. There are hints of a later summer and autumn occupation, from both hazel nuts and, possibly the salmon run, but it would be easy to make too much of this. Further finds of blade core industries have been made from surrounding fields on all sides of the river here and the junction appears to have been an important focus for activity.

Past Manor Bridge a range of mesolithic and possibly mesolithic sites are known. There is a generalised background scatter of mixed prehistoric activity in most fields in this area but some concentrations are notable. A mesolithic scatter at Edston 2 was identified through field walking and test pitting (Figures 264-270, **App. 2.2**). The scatter is small, less than 20m in maximum dimension, the densities of artefacts are low (*c.* 10 per m^2) and the assemblage from here is rather ambiguous and frustrating. There are a number of hints of mesolithic stone working activities; the importance of regular blades, formal blade cores, some bipolar knapping and artefacts with mesolithic affinities such as microburins and an unusual microlith, but there are few direct morphological referents. Notwithstanding these factors it seems most likely that this small site represents some kind of mesolithic site. It lies just below the break of slope beneath a gently domed ridge in a field on the relatively steep north banks of the Tweed at *c.* 205m OD. It is possible that the scatter has been pulled slightly downslope from this ridge by the action of the plough. From the level area immediately above the flint scatter commanding views of the complex river intersections of the Tweed, Lyne and Meldon some 1-2km below are available. It seems likely that this site is some kind of temporary settlement.

Microliths have also been found at Meldon Bridge although few details are presently available (Speak pers. comm.). The junction of the Meldon and Lyne here is a source of chert pebbles (Wickham-Jones and Collins 1978) and above Meldon, on the large post glacial terrace at Sherrifmuir, blade cores and some blades (Warren 1998) may indicate some kind of early prehistoric activity, although most of the material on this terrace is later in date, possibly relating to the complex series of monuments constructed here. However the association between the bladelet cores and an early neolithic mortuary structure and standing stones (once part of a complex arrangement) is provoking. A similar pattern can be observed on a low terrace in Drumelzier Haugh Farm, where within 10m of the standing stone, a collection of 21 artefacts was made by Mr and Mrs Hutchison, (BMA 3083-3049, my ref. DRM0001-DRM0020). Three chert bladelet cores less than 30mm in maximum dimension, and a microlithically retouched denticulate blade, with concavities 5mm across *hint* at mesolithic activity although the collection is unrepresentative and possibly mixed.

A short distance downstream of Drumelzier and high in the Broughton Heights (300m OD) along the Easton Burn a small blade and platform core industry is known from erosive contexts at Stobo Hope Head. Further upstream at Clashpock Rig microlithically retouched artefacts and classic pyramidal blade cores have been recovered in association with a chert rich Lateglacial (?) river terrace. On the slopes immediately to the north here are pits from the chert quarry at Flint Hill. Further quarries are known in the area, but in no other example is there such a clear association with a surface scatter (**7.3**).

These complex sites, many of which are only arguably mesolithic are high up the Tweed in a variable valley. The valley bottom itself is now productive land, centuries of drainage and improvements having transformed the fluvial soils. But this is less likely to be true of prehistory and a diverse wooded landscape was likely, especially on higher slopes (although these areas would not have been above the tree line, Tipping 1996a). In the broader areas of the valley the river is likely to have meandered slightly, perhaps maintaining these areas as slightly open. There are fewer indications of the widespread use of the landscape witnessed in the middle Tweed but this is likely to be a product of research. Microliths from Kittlegairy, and possible activity high up near chert quarries hint at wide ranging settlement. It is also notable that most of the scatters further up the Tweed are small and much more restricted in raw material use than those of the middle Tweed. Again, this is difficult to interpret at this stage, and much more research is needed to clarify our understandings of settlement in the upper Tweed.

3.1.9: Discussion

A number of themes arise from this review of the mesolithic settlement of the Tweed Valley. The data is uneven, and does not allow quantified analysis but it is still meaningful. There is considerable variation between sites in the region, in terms of site location, size, raw material utilisation and typological referents. It is difficult to interpret this range of data; chronological variation is likely to be significant, our understandings of stone working in the area are poorly developed and we are likely to normalise a diverse group of practices. At the broadest of levels some sites with hints of early activity can be identified – Craigsford, possibly Airhouse – but it is difficult to interpret Mulholland's arguments that Rink and Dryburgh are earlier than Kalemouth. Many sites in the middle valley have later material on them, at Kalemouth the proportion may actually be significant. Unfortunately it is difficult to characterise the relationship between 'mesolithic' and 'neolithic' in these scatters although the industries may provide an important analytical mechanism for understanding the mesolithic-neolithic transition.

In terms of considering settlement a number of themes are apparent. The location of sites varies, and although important, the river was not the exclusive focus of activity. It is unfortunately difficult to compare the character of activity away from the river with that near it. Sites are found on bluffs above rivers, as well as on lower terraces and a detailed examination of the geomorphologic context of many sites is needed. Notwithstanding this, many river junctions appear to have been important locations. At two of these sites, Manor Bridge and Rink, although large scatters are known from one particular location mesolithic finds are also made in many fields in the immediate area. The impression is not of a single well-defined site but of a more fluid use of a river junction, with many different occupations. Similar patterns may be apparent near Dryburgh, where many other riverine sites are known and extensive activity on the moors and lochans of Bemersyde may be indicated by the distribution of waisted pebbles. Again, chronological variation is likely to be important in this rather fuzzy picture, but diversity appears to be a significant factor in trying to understand these settlements.

Much work is still needed on the Tweed Valley sites, not least to standardise samples from many sites and to accurately characterise the extent of settlement in the area. However the evidence, as it stands, demonstrates that the area is quite distinct from the mesolithic of further north in Scotland, where a tight riverine focus appears to have existed. The range and character of the lithic industries themselves, with their distinctive raw materials allow many comparative studies. These industries are not straightforward, and much work is required but the microlithic industries of the Tweed Valley still have much to tell us of the character of settlement in the region.

Appendix 4: Studies in the Lunan Valley

This document reviews a series of lithic scatters discovered near Balgavies Loch in the Lunan Valley, Angus and outlines the results of small-scale fieldwork near Rescobie Loch and Turin Hill, Lunan Valley. The assemblage donated to the author by Mr David Henry in 1998 includes mesolithic, neolithic and bronze age material. The assemblages are complex, and it is not possible to identify mesolithic industries or sites as such, only pieces which typologically, are likely to be mesolithic. Fieldwork aiming to retrieve more samples of similar industries was abandoned due to poor results and difficulties with the redeposition of colluvial material.

4.1: Background

The Lunan Water runs eastwards through a shallow lowland valley (Figures 335-337). Balgavies and Rescobie are part of a chain of lochs (some now drained) towards the head of this fifteen-mile river, which at this stage is little more than a stream linking these boggy areas. Glacial gravels and boulder clays mask Old Red Sandstones in the valley bottom, whilst conglomerate is exposed on the hilltops to the north (Turin Hill 252m). In the lower valley river terraces are significant and catastrophic episodes of sand movement during the medieval period have buried large areas of the landscape (Pollock 1985). Soil movement has been very significant in the lower valley and the extent of Holocene geomorphic activity in the upper remains unclear, although soil-loss from modern agricultural contexts is clearly visible. The valley is warm (Birse 1971) and offers good agricultural potential; much of it is used for cereal crops today. Little environmental research has taken place in Angus and the history of the landscape is a little obscure although the immediate river-side and floodplain is likely to have been dominated by alder carr, as indicated from a long Holocene sequence from loch margins at Reswallie House (M Church pers. comm.).

In recent years our understandings of the prehistory of eastern Scotland have improved greatly. The east is one of Scotland's main arable zones, and commercial farming and agricultural improvements have contributed to the destruction of many archaeological features. Despite the undoubted loss of many sites extensive programmes of aerial survey have helped document a complex archaeological landscape (see for example Barclay 1992). Research programmes are beginning to answer some of the questions raised by features that vary from pit alignments and square barrow cemeteries to simple ring ditches and sub-circular enclosures. Many earlier prehistoric monumental structures have been excavated in the region: Pitnacree (J Coles & Simpson 1965), Balfarg (Barclay & Russell-White 1993), Dalladies (Piggott 1971), Inchuthil (Barclay & Maxwell 1991) North Mains (Barclay 1983), Balbridie (Fairweather & Ralston 1993), the Cleaven Dyke (Barclay & Maxwell 1998). In the Lunan valley itself recent excavations have included the enigmatic neolithic pit enclosure at Douglasmuir (Kendrick 1995). Despite the undoubted value of these excavations, and the light they have helped to shed on aspects of earlier prehistoric lives, we still understand very little about prehistoric settlement in the east during earlier prehistory, especially during the mesolithic and neolithic.

In the Lunan Valley the fragmented character of the archaeological record in a zone of destruction is clearly apparent. Many poorly documented nineteenth century discoveries of slab built cists associated with 'urns' (often Food Vessels) in the gravels at the head of the valley are testimony to fairly extensive patterns of agricultural settlement during the second millennium BC (information from varied NMRS references). Some of the enigmatic sub circular enclosures from the aerial photography record are probably also related to this pattern of settlement, but the links are hard to establish. For the neolithic period our evidence is still scantier, and mainly appears to be ritual in character; cairns still stand at Rescobie Loch and on Guthrie hill, and more doubtful cairns have been recorded. Two possible stone circles are known in the upper valley. Blackgate (NO484528) was a complex structure involving a cairn. Cup and ring marks are found on Turin Hill, and a standing stone is found just to the north of Rescobie Loch. Pit alignments such as Douglasmuir (Kendrick 1995) are testimony to early neolithic activity, but the character and extent of this settlement is not clear. Very little is understood about the mesolithic in the area. Sherriff (1986b) reviews a number of sites with possible mesolithic affinities, all are inconclusive (*e.g.* Bonnyton; see Sherriff 1981; Brophy & Stuart 1997; Stuart 1998).

The apparent invisibility of the mesolithic in the Lunan is certainly related to the lack of research in the area but is further complicated by real gaps in our understanding of stone working traditions in the area. The recent discovery of an 'unusual lithic assemblage' at Lunanhead (Wickham-Jones and MacKenzie 1996) is just one example of the difficulties we face in an area where, too often, the sites that have been excavated and dated have not helped to inform us about traditions of stone tool procurement, manufacture, use and discard. Even our formal typologies for the east are underdeveloped, and many sites throw up surprises of one kind or another. It is also arguable (below) that the comparative scarcity of flint in this area has significant implications for the form of the industries in question. In any case the Henry collections demonstrate quite clearly the problems and potentials of the material from the area.

4.2: The Henry collections

Since the mid-1980s Mr David Henry has been collecting flints from the fields near his home (Sherriff 1984, 1985, 1986a, 1986b). The Henry collections mainly come from the south facing slopes of a large gravel ridge to the north of Balgavies loch. 1,000 artefacts collected by Mr Henry were analysed by Mr J Sherriff and catalogued before being donated to Angus District Museums (Sherriff 1986b: the artefacts are now in Montrose Museum). Ninety-three artefacts from near Balgavies castle were donated directly to the museum (Eames 1990). A further 1,113 provenanced artefacts were amongst the *c.* 1,400 stones Mr Henry kindly lent to the author in 1998. These have all been washed and the majority labelled in ink, beginning at 1001, in order that they may be stored with the materials in the Montrose museum. Some artefacts have been placed in bags with number labels. Some very small débitage chips were not given individual numbers but bagged in bulk. Mr Henry had recorded the location of finds accurately, giving them a six-figure grid reference, often marked in pencil on the artefacts, and this has greatly increased the amount of information that can be derived from the material (Figure 338). The material in Montrose Museum has also been inspected, but not reanalysed.

Sherriff notes the presence of a range of formal artefact types dating from the mesolithic through to later prehistory in the collections, and discusses possible affiliations of the material, noting that it is difficult to understand the industries. He argues that the assemblage as a whole is comparable to that from Banchory rather than Morton but comments that even in the former case 'there are however significant differences which suggest that either alternative influences moulded the character of the Balgavies flints or else most are not of mesolithic date but later' (Sheriff 1986b). In fact the assemblage is clearly severely mixed and differing locations appear to have been affected by this to differing extents. Some artefacts are abraded or patinated whilst others are relatively fresh. These factors do not provide a relative chronology of the artefacts involved, as patination and abrasion are both micro-scale phenomena dependent upon localised conditions, but they do alert us to the potential for a wide time span. Although generally comprehensive Sherriff's report is slightly problematic in discussing the assemblage as a whole, rather than concentrating on the different foci identified by Henry. The discussion presented here is structured around the various localities where Mr Henry collected before a discursive conclusion is offered. However some general comments should be made before specifics are dealt with.

4.2.1: Raw materials

The raw materials are dominated by flint (94.2%) with small amounts of agate and occasional imported exotic materials. Pebble flint dominates. The flint pebbles utilised appear to have been of relatively high quality although problems with hinge fractures are quite common and they were apparently quite small. Only seven artefacts are of 50mm or greater in maximum dimension in the assemblage examined, and only thirty over 40mm. Sherriff describes two pebbles of *c.* 50mm in maximum dimension and this is quite congruent with the bulk of the assemblage. However the presence of some very large blades and blade fragments on some sites is testimony to some alternative sources. In this sense the rarity of cores in the collections as a whole is interesting. This may imply that raw material was highly valued. Sherriff examined exposures of local gravels and found little evidence to suggest that they contained flint pebbles, but does record that flint could be collected from the beaches near Montrose and further north (1986b), this area is also famed for its agates (Anon 1989). Small natural flints have been found in all the assemblages analysed. David Henry has noted fairly sizable nodules on Angus beaches especially at Arbroath. Limited fieldwork by the author did not locate any flint at Lunan Bay itself.

The flint varies in colour on a continuum from yellow and honeys through greys and more complex mottled examples, and also includes high quality red and red/orange material. Grey and yellow flints are most commonly found on the beaches of eastern Scotland (Gemmel and Kesel 1979). It is, unfortunately, macroscopically impossible to ascertain whether any of the material in the Henry collections derives from the flint mines at Boddam which were in use throughout much of the neolithic (Saville 1994b, earliest radiocarbon dates *c.* 3500 cal BC). One intriguing pattern arising from my analyses is that whist the colours of flint utilised vary widely between sites, at any given site the proportions of red, orange, pink and yellow flint remain stable. That is to say that regardless of how much red flint there is in the assemblage, be it 3% or 8%, there will be proportionally as much orange and as much yellow, in broad terms. It is exactly these colours which have long been held to characterise the material derived from the Buchan gravels – even if grey is actually the dominant colour. In any case this stability seems unlikely to have arisen from localised beach collection and is of some interest. In the assemblage as a whole there are a few examples of clearly imported flints (Sherriff 1986b). A single pitchstone blade is testimony to some external connections and small amounts of dark-grey high quality flint may have originated from Yorkshire.

There is no worked quartz in the collection. The difficulties of identifying worked quartz are well known (Bradley 1995). In the Lunan these problems are exacerbated due to the frequent occurrence of quartz in the local rocks and soils, ranging from glacially derived material to fresher exposures. Understandably Mr Henry did not collect quartz artefacts, noting that, 'for every shoe-box of flints collected there would be at least a corresponding cart-load of (?)worked quartz' (letter to the author, 17/12/98). Agate was collected and forms an important, if small, aspect of the assemblage – in some sites agate forms as much as 10% of the total. Notwithstanding this the role of agate as an aspect of the stone tool industries remains rather unclear. Although clearly struck flakes, sometimes retouched, and cores are present, much agate is highly irregular and it is uncertain whether it has been humanly struck. All the agate present is very small. It may also be important to consider the possible local exploitation of agate as an alternative to quartz (see Wickham-Jones 1986). It is possible that agate forms a larger part of later prehistoric industries than earlier prehistoric. Speculatively it may be worth considering the decorative aspects of these stones with their detailed geometric patterns.

4.2.2: Condition

The artefacts range greatly in condition and appearance. In part this is due to their long life in a modern plough-soil. Edge damage has occurred on many pieces (35.8% in total) and many are broken (27.8%) or possibly broken (6.9%). The effects of ploughs on artefacts can be considerable and false patterns can easily become apparent. In particular ploughs may create 'false' notches in artefacts, and some of the irregular, indeterminate notched artefacts may be no more than fortuitous outcomes of plough and flint (Haley 1990). Artefacts are abraded (5.2%), patinated (9.3%) rolled (1.3%) and burnt (20.6%) and it is clear that there are important post-depositional processes in play in the area. The extent of abrasion, patination and burning can also complicate the identification of retouch or break facets. This is not a problem with formal artefact types, but can create significant difficulties in identifying and describing irregular artefacts.

Burnt flint is occasionally incorporated into agricultural contexts in this region through liming (as at Bonnyton, near Montrose; Stuart 1989). The burnt material within the Henry collection varies widely, some pieces are clearly burnt artefacts (retouch is still visible on some) whilst others are very irregular burnt chunks. Little burnt flint has been found in other fields in the area and Mr Henry notes that more recently introduced material is clearly distinguishable from the prehistoric. Although some caution is necessary it seems likely that the majority of the burnt flint in these collections is of prehistoric date. It is therefore difficult to interpret the range of artefacts. Some are likely to be potboilers; others are clearly fine artefacts. The lustre of heat-treatment is apparent on other pieces. It would appear that fire and flint could be associated in many different ways at Balgavies, and it would not be appropriate to systematise these observations too rigidly.

4.2.3: Review of sites

4.2.3.1: Far Long Bank

268 artefacts
NO531514

The largest single collection of artefacts in the Henry collection is from Far Long Bank and the size of this collection enables more detailed comments to be made than is possible for some of the other areas. The assemblage is associated with a crop mark enclosure. The collection has clearly been mixed and presents serious analytical difficulties: 6.3% is abraded, 5.6% patinated, 1.7% rolled and 14.2% burnt. 27.6% are broken and another 7.1% possibly broken. Edge damage is found on 31% of artefacts. Cortex is common, although rarely found on blades.

The assemblage is dominated by varied colour flint. Honey and tan were numerous but pink, red, yellow and light grey were all also important. Much of this seems to be pebble derived. The small amounts of agate are also pebble derived; they include a range of small flakes and chunks. The flint assemblage is quite balanced with regular and irregular flakes significant (Figure 341), blades present in small numbers and cores, bashed lumps or split pebbles very rare. Twenty-seven (10.1%) flints are retouched into formal artefacts (see below) and eleven (4.1%) possibly retouched. The collection includes a single flake of Arran Pitchstone.

In a mixed assemblage it is difficult to identify categorical reduction strategies or themes. However it is notable that small rounded battered pebbles of honey-yellow flint are treated in a different way than other flint types. A number of these pieces demonstrate heavy direct percussion, minimal platform preparation and occasional evidence of bipolar reduction. In opposition to this other flints used for regular flakes and blades have diffuse bulbs of percussion and careful preparation. Heat treatment of flint was common although this does not appear to have included the small honey pebbles. Cores are rare and include fragmentary platform blade cores and more irregular flake cores. There is no indication of an exclusive approach to blade production but mixing is clearly significant in this industry as a whole. Platform preparation and type ranges widely.

The site includes a range of retouched artefacts, and some types were also observed by Sherriff (1986b) who notes that the area is a concentration of tangs, points, arrowheads notches, wedges and cores but that end-scrapers are rare. There are six scrapers in the sample I analysed, including two fragmentary convex examples, two irregular scrapers, a concave scraper and a heavy convex scraper. The distinctive wedge shaped scrapers noted by Sherriff to be concentrated here have not been seen in the assemblage. These are interesting artefacts, other formal wedge shaped scrapers are known from a late bronze age house at Peterhead (Warren forthcoming c) and a similar date might be likely here. Four rather unusual (?)microlith fragments include two irregular possible backed blades(?), a doubtful truncation, and a backed blade with a truncation forming a point. Sherriff (1986b, #47) also notes an unusual 'obliquely trimmed piece' from Far Long Bank (NO531515). None of the microliths are firm typological referents. One dubious microburin is also present as well as a series of notches. Two artefacts have weak tangs (see below), also noted by Sherriff (although, of the examples he illustrates only #16 is convincing). Many flakes display small 'microlithic' retouch, but rarely take formal types. Many other approaches to retouch are also apparent, and this includes one possible leaf shaped arrowhead. More common are small-scale alterations of the edge-angle of a piece; this type of working is relatively common throughout prehistory.

Although the date of this type of site is very hard to establish a late neolithic/early bronze age context is appropriate for some of the material. A focus on the production of flakes, with the use of some locally available agate to supplement supplies of flint would certainly be coherent with this assessment. Some links with scraper types to bronze age structures in Peterhead have already been noted, and it is important to recall the crop mark enclosure associated with the site. Alongside this there are also hints of a rather different stone-crafting traditions. There are some mesolithic affinities represented in a bladelet core, some fine blades and some microlithically retouched pieces although none of these are of recognisable formal types. Interestingly these do not feel immediately comparable to later mesolithic sites in the east of Scotland, although with such a poor sample it is difficult to assess these factors. There are also hints of neolithic activity; a possible leaf shaped arrowhead for example. The presence of a flake of Arran pitchstone is also of interest, as these materials often arrive in neolithic contexts in this area.

Far Long Bank is difficult to interpret, the assemblage is mixed and some is damaged. There are indications of mesolithic activity in the area, but in no sense can we understand the character of the mesolithic assemblage. The majority of material on site is likely to be later prehistoric in date. In this sense it is interesting, if inconclusive, that 25% of blades are abraded and a further 8.3% patinated. These proportions are higher than average for the site.

4.2.3.2: Gallow Hill

97 artefacts
NO 529514

A total of ninety-seven artefacts from Gallow vary greatly in condition: ten (10.3%) are patinated, four (4.1%) abraded, and sixteen (16.5%) are burnt. Forty-six artefacts are definitely edge damaged and five possibly (total 53.6%), twenty-three definitely broken and eleven possibly. The assemblage is dominated by flint, with only a sole agate chunk present. The flint is mainly from pebble sources and varies in colour. Grey is most numerous but honey, red, pink, orange and white are all also present in significant quantities. Most of the flint seems to have come from pebble sources and often contains cavities or flaws, hinge fractures were common. Heat treatment is evident on a number of the pieces. 4.8% of removals are primary, and a further 26.2% cortical. This is much lower than at Far long Bank (Figure 342). The amount of cortex on pieces varies; all blades for example are tertiary.

The assemblage itself is dominated to a surprising extent by regular flakes (Figure 343) which are generally fairly small (23.5±8.5mm in maximum length). Blades are also important. There are a few cores, bipolar cores and bashed lumps. These cores are varied, including both blade and flake removals with varying numbers of platforms. A variety of percussive evidence is also present; artificial platforms are quite common and can be complex.

Thirteen artefacts are definitely retouched from Gallow and a further seven might be. This high proportion of indeterminate artefacts is due to the extensive damage on some of these pieces. Retouch is most likely on regular flakes and blades (Figure 344). Convex scrapers are the most important artefact type (n=8); these include small thumbnail examples and larger end of blade or flake types. A single rather unusual straight scraper is also present. There are three miscellaneous retouch artefacts; a poor notch, a fragment of a (?)microlith (Figure 340) as well as a distinctive fragment of a large 'tanged' or pointed implement with microlithic retouch. Even in its fragmentary state this piece is much larger than the tanged material discussed by Sherriff (1986b).

The assemblage from Gallow is also unusual and it would not be appropriate to try and pigeon hole a collection that is clearly slightly mixed, or at least includes a little residual material. Regular flakes derived from pebbles dominate the assemblage and scrapers are important. This is paralleled at Balbridie and a mixed flake and blade industry is often found on early neolithic sites. Gallow is clearly differentiated from the Far Long Bank, both in terms of the formal proportions of artefacts and the raw materials used. Interestingly Gallow has a lower proportion of cortical material than the former site.

4.2.3.3: Guthrie Hill and Guthrie Hill Summit

Guthrie Hill Summit, n=92 (157) NO556514
Guthrie Hill, n=28, NO554514

These two comparable collections are not discussed in Sherriff's report. The assemblage of material from Guthrie Summit includes sixty-five small chunks of burnt material. These are excluded from the analyses following. Even then, burnt artefacts comprise 10% of the 92 remaining pieces although the majority are fresh (82.2%) and mixing does not appear to be as significant as some sites. However thirty-three artefacts are broken, and eleven possibly broken. Forty-two are edge damaged. The assemblage is dominated by flint with one agate and two rather unusual green 'agates'.

The flint was dominated by mottled grey-creams which were twice as frequent as honey coloured flint (at Far Long Bank honey was four times as common as grey). Reds, yellows and oranges were very rare but dark-grey high quality flint was significant. Further differences from the Long Bank traditions are clear in the reduction evidence, only 2.2%% of the removals are primary and 27.8% secondary. This is more similar to the proportions of material at Gallow Hill. Large nodules of flint were also being exploited here; eight pieces are greater than 40mm in length – a much higher proportion that on other sites. The assemblage includes many removals whilst cores are rare (Figure 345). Blades, regular flakes and irregular flakes are all significant. Eleven artefacts are retouched, and five possibly retouched. This includes four medium sized scrapers, two of which are formal convex edges, the others more irregular. The other retouched artefacts are light notches, or irregular edge retouched flakes. No blades are retouched.

Within 200m of Guthrie Summit, a collection of twenty-eight artefacts from Guthrie Hill is also comparable. 82% are edge damaged and fifteen broken but many are fresh. The assemblage is comprised entirely of flint, and all are removals, five blades, nineteen regular flakes, two chunks and two irregular flakes. These include seven retouched artefacts and two possibly retouched. Formal types include a very fine leaf shaped arrowhead with parallel removals (Figure 340), two possible burins and edge retouched flakes with light nibbled retouch, some may be irregularly serrated. These latter are also found at Balbridie (pers. observation).

The assemblage is complex, and clearly distinct from some other traditions. Blades and large flakes are important and percussive evidence also indicates the importance (although not exclusive) of soft percussion. There was also dorsal evidence for opposed platform removals from blade cores, including overshot 'rejuvenating' flakes. In general production waste evidence at Guthrie is unusual and there is little of it. This does not mean that no production was taking place at Guthrie, (the presence of a number of rejuvenation flakes is clear evidence that it was) but may be indicative of differing attitudes to production and waste, in particular this suggests that production was more controlled. It is difficult to systematise these observations, but again an early neolithic date may be appropriate. There are many local parallels with Lunan Head for example (Wickham-Jones & MacKenzie 1996).

4.2.3.4: School

School (north end): NO539515, n=148
School: NO538515, n=40

The collection from School north contains 148 artefacts. The assemblage is complex and hard to interpret: seven (4.7%) are abraded, twenty-seven (18.2%) burnt, nineteen (12.8%) patinated and five (3.4%) lightly rolled. Despite this mixture only 26.4% of artefacts are edge damaged and only forty-five broken. Flint dominates but 8.1% of the assemblage is agate. Honey coloured flints are the most frequent but greys are also significant including dark grey. Red, orange, yellow and pink flints are present in small but consistent numbers. There is consistent evidence that water rolled and battered pebbles were exploited and there are few large artefacts here. Percussion and preparation vary widely. Agates are generally crude, but suggest that some working is taking place on site.

The assemblage is also dominated by removals rather than cores although the presence of bipolar cores should be noted (Figure 346). Blades are not very significant, but chunks and irregular flakes are important. High proportions of cortical material on site (Figure 347) may also indicate the importance of production waste, especially in terms of irregular flakes. There are fourteen retouched artefacts in the assemblage and three possibly retouched. The formal artefacts include a leaf shaped arrowhead, five scrapers (some fragmentary), two notches and two unusual possible microliths. Both are bulbar with microlithic edge blunting.

The forty artefacts from School, 100m away from the north collection, are slightly different in character. They are comprised entirely of flint and include 27.5% patinated material.

Again, removals rather than cores dominate (Figure 348), but there is little sense of unity. One core is a fine split pebble blade core. All retouched artefacts are irregular.

The two collections are strictly non-diagnostic. They include a range of production debris, including the exploitation of agate, and few formal artefact types. There are hints of mesolithic activity, some unusual 'microliths' and a blade core, whilst a leaf shaped arrowhead is suggestive of neolithic activity. The range of rolled, abraded and patinated material is also interesting and it seems likely that the collection is a complex palimpsest.

4.2.3.5: Windy Knowe

n=119

NO544514

A total of 119 artefacts were recovered from Windy Knowe. Of these, twenty (16.8%) are burnt, nine (7.6%) patinated and six (5%) abraded or lightly rolled. 38.1% are edge damaged and 38.6% broken. The assemblage is slightly unusual and may be a palimpsest. 112 (94.1%) artefacts are flint and the rest agate: this aspect of the assemblage is comprised of irregular flakes, chunks and split pebbles, seemingly worked (Figure 349). The flint is from a pebble source and grey pebbles are more common than honey. 69.5% of reductions are non-cortical and this is a high proportion. The assemblage includes a single bipolar core and three blade/flake cores, often fragmentary. Blades are significant, as are regular flakes and chunks and the assemblage includes a rejuvenation flake from a blade core.

Eighteen artefacts (15.1%) are retouched, and five (4.2%) possibly retouched. These range in type and include six scrapers, mainly of convex types, seven edge retouched blades and flakes, not of clear morphological types, but with parallels at other sites in the area, two notches and one possible, but unusual microlith, a fragmentary partly backed blade. Few of these artefacts are strictly diagnostic, especially in association with the rather varied state of many pieces but an early neolithic date may be appropriate for some of them. There are also similarities between this site and the assemblage from Guthrie Hill and Gallow in terms of production evidence.

4.2.3.6: Windy Knowe (near road) and Smiddy

Windy Knowe, nr Rd NO548515, n=26

Smiddy NO547515, N=35

A small collection of twenty-six artefacts from near a road on Windy Knowe is comprised entirely of flint. Seven are abraded, two patinated and three burnt whilst fourteen are edge damage and four broken. Complex processes may be involved. In any case the assemblage is dominated by regular flakes with a few chunks and irregular pieces and seven pieces are retouched (Figure 350).

Retouched pieces include a barbed and tanged arrowhead with a tip and tang missing, four convex scrapers, with one fine end of blade example and two unusual notched or nosed implements. These pieces are difficult to interpret, and need not necessarily be contemporary. The date of the assemblage is therefore doubtful and it would not be appropriate to categorise these any further.

A total of thirty-five artefacts are known from Smiddy (NO547515), adjacent to the scatter at Windy Knowes near road. Of these artefacts twenty (57.1%) are edge damaged but only three broken. Eight are burnt, and three abraded but none are patinated or rolled. The assemblage is dominated by regular flakes and chunks (Figure 351). The retouched artefacts include two convex scrapers, a concave scraper and a fine double convex scraper. There is an irregular edge retouched piece and a combination serration and notch artefact. The assemblage is difficult to date but quite comparable to that from Windy Knowes Rd. Seven further artefacts from NO547516 are also dominated by regular flakes and include a convex scraper on a rejuve flake.

4.2.3.7: Bothy and Area

Sixty-nine artefacts are known from Bothy (NO533516). Of these sixteen (23.2%) are patinated or patinating – many of these are chunks or irregular flakes, four (5.8) are abraded and twelve (17.4%) are burnt. Eighteen (26.1%) are edge damaged, and twelve (19%) broken. The assemblage is dominated by flint, with just three chunks and irregular flakes of agate. 6.7% of the assemblage is primary, and 26.7% secondary. Regular and irregular flakes dominate the assemblage with a few blades (Figure 352). The presence of bipolar cores is notable. Nine artefacts are retouched, and three possibly. These include four scrapers, one a fine convex side scraper, four irregular retouched flakes and a single (?)microlith fragment: a large, bulbar, backed blade (Figure 339). One scraper (Figure 339) has two scraper edges above each other, each initiated from a different surface: the artefact is directly paralleled at Peterhead.

Two further small assemblages from near Bothy help fill out this picture. Twenty-nine artefacts from NO534516 are also dominated by regular flakes, with few blades. Twenty-six artefacts are of flint, and only three agate. This includes a retouched agate flake, unfortunately no diagnostic. There is also a possible backed blade. Nineteen artefacts from 535516 include two cores and are dominated by irregular flakes. Retouched pieces include an end of blade scraper with a possible deliberate tang.

4.2.3.8: Long Bank

NO 533513

Thrity-five artefacts are known from Long Bank. Only five (14.3%) are edge damaged, and seven (20%) broken. 34.3% are burnt and 11% patinated but these are mainly small chunks and irregular flakes. The number of burnt artefacts has clearly affected the composition of the assemblage and the collection is of more interest for a few distinctive pieces. These include a pyramidal blade core on red flint (Figure 339) possibly with mesolithic affinities, two further blade/flake cores, two notches, a later prehistoric scraper and a fine leaf-shaped arrowhead. Blades are significant in the scatter including a number of facetted examples. This is difficult to interpret and again the indications are mixed with some suggestions of mesolithic, and some of early neolithic affiliations. With such a small sample it would not be appropriate to draw strict conclusions.

4.2.3.9: West Guthrie

n=13

NO 552514

A small assemblage of flint from West Guthrie is of interest because it includes a number of fragmentary large tanged implements found occasionally on other sites in the region (Figure 339). *1394* is a complex artefact with convex scraper edge at distal and extensive retouch on both the left and right hand sides at the proximal making a lopsided tang or point. The tang on *1386* is made by retouch on only one side. *1393* also has a tang. These implements, manufactured on large blades are very distinctive and it is notable that West Guthrie as a whole is dominated by blades, sometimes with extensively facetted platforms. Sherriff discusses these artefacts, but his examples appear to be smaller, and those illustrated are not typical. Sherriff mentions Star Carr parallels, but the artefacts illustrated by Clark (1954: Fig. 37) are rather different in type, and in no instance is a scraper with a tang identified. Large blades, with complex preparation are known locally at Lunan Head, although these examples are not retouched. It is important to note that these 'tangs' form part of fragmentary pieces. The artefacts are complex, and further work is needed to clearly establish their date.

4.2.4: Discussion

The Henry collections are a rich resource for understanding the settlement of the Lunan valley. As noted by Sherriff (1986b), they contain implements of many different periods of prehistory, and, in the context of a poorly understood region, it is difficult to interpret many aspects of the assemblages. However in the last 15 years certain advances have been made in our understanding of traditions of lithics manufacture use and discard in eastern Scotland and these can contribute to interpretations of the Henry assemblages. Firstly however we should note that the agricultural context of the artefacts has probably had a considerable effect on them. Edge damage and breakages are common, although significant differences exist between sites. Furthermore patination, abrasion and burning have also been significant processes. In this sense it is notable that none of the scatters falls easily into a chronological category and that mixing, by unknown mechanisms, has clearly been important. This should not surprise us, as the Lunan is a rich agricultural area and increasing mechanisation is undoubtedly destroying many scatters, leaving us with complex aggregated assemblages. However modern agriculture alone cannot explain our fuzzy scatters – it is likely that they are testimony to complex prehistoric patterns of land use.

Differing assemblages fall into different categories, and many refuse easy definition, but there are indications of settlement during the mesolithic, neolithic and bronze age in the collections. It is notable that in no instance has a classically, or exclusively mesolithic site been found. Mesolithic artefacts are present, a few fragmentary microliths and possibly some tanged points for example, as well, most likely, as some notches, but no mesolithic site has been found. It is also very interesting that there is little or no indication of a narrow blade assemblage of the sort that is dominant in eastern Scotland, and that a number of artefacts have some affinity to early mesolithic traditions.

The early neolithic is present in terms of formal pieces, as for example leaf shaped arrowheads, and arguably pitchstone but may also be identifiable as traditions and scatters. Again, no site is easily definable but Guthrie Hill, Windy Knowe and possibly Gallow Hill are all examples demonstrating a focus upon blades and structured approaches to production and deposition. Both the former sites sit on a low gravel ridge above the valley bottom and are of real interest in light of early neolithic crop mark sites in the region. It is also interesting that putatively mesolithic artefacts are turning up in and around these scatters. Whilst our analytical tendency is to dismiss this as residuality it may also arise from complex processes of transformation in routines of stone craft and/or land use. These early neolithic traditions focus upon the production of flakes with occasional blades (sometimes richly prepared). These scatters often have few cores and very little cortical débitage. Flint, apparently carefully selected, dominates,

Later neolithic or bronze age activity is also likely in some scatters, certainly the large collection from Far Long Bank seems likely to incorporate a bronze age aspect, perhaps in association with crop mark evidence. These industries may include reliance on local agates, and rather expedient strategies of stone working. Cortical débitage is quite common.

The collection is therefore very informative of a rich prehistoric landscape, and in passing, it is of considerable interest that no artefacts have been recovered from near Westerton Standing stone. But there are considerable problems with the material and in no case can a clear mesolithic, or neolithic site be identified. Whilst some of these reasons may be associated with our crude understandings of lithic traditions in the area it is also likely that geomorphic processes have been significant. A small-scale programme of fieldwork was initiated in 1998 aiming to examine a transect from the hill tops to the north to the lochs in the centre in order to identify scatters and, if possible assess their geomorphic context. The possibility of returning to Henry's sites was considered, but due to the long history of collection here it was considered that identifying and evaluating fresh sites would be more valuable. At the time, examining Rescobie Loch also offered two valuable possibilities; firstly, assessing if the settlement near this loch was similar to that of Balgavies; and secondly, integrating research with a pollen core planned for extraction from Rescobie as part of the Fieldschool. Unfortunately the core from Reswallie was not suitable for detailed palaeoenvironmental assessment.

Before the results of the fieldwork are presented it must be noted that this work was very small-scale and abandoned quite rapidly. Results were poor and difficulties with geomorphic processes were significant. Larger scale research would be able to overcome these problems, but in the context of this project it was considered appropriate to focus elsewhere.

4.3: Lunan Valley Survey 1998

Seven fields, or samples of fields, were walked in a two-week period in spring 1998. These fields lay on slopes dropping from Turin Hill through West Mains of Turin to Haresburn and Rescobie Loch. In the summer of 1998 small-scale test pit survey of a gravel ridge immediately to the south of Rescobie was undertaken. This rolling glacial ridge provided a low raised area, presumably above the alder carr that likely dominated the valley bottom during prehistory and seemed a good target for examination. I am grateful to those who assisted with the fieldwork and to landowners in the area.

The Field walking was unsuccessful (see Note 1). Very few artefacts were recovered in any field, despite generally good field walking conditions and good control collection of post medieval ceramic. Clear difficulties could be identified with soil movement. This was evident in lynchets in modern agricultural contexts, as well as experienced first-hand on windy days! In many cases low ridges in fields were clearly being ploughed out and bedrock exposed at the surface. Down slope of these ridges build-ups of colluvium probably bury large parts of the prehistoric landscape. Considerable problems with colluvial movement were, for example, during the Field School excavation of a bronze age roundhouse at Hawk Hill, further down the valley, where subsoil was buried under several metres of redeposited colluvium.

The artefacts recovered from the fieldwalking varied in type and do not form a coherent group. Most came from a large field low in the valley immediately above a round barrow near the floodplain. These included a fine end of blade scraper and a blade core. From such a small sample area it is impossible to draw far reaching conclusions but the extent of redeposition and agricultural impact was clear, and disheartening.

Similar problems were noted in the test pits excavated in long-term pasture on a well-drained ridge immediately above Rescobie Loch. Twenty-four pits were excavated on a 20m grid as a student training exercise. All spoil was sieved at 5mm and all potential artefacts kept. However no artefacts were identified and the test pits tell a story of small-scale soil movement. The field is full of low rolling ridges. The subsoil is a compacted but brittle orange-brown gravel with sand under 15-30cm of plough soil. The gravel includes very large clasts, mainly sedimentary in type and sometimes rotting *in situ*, and is a glacial deposit. In the lower areas between the ridges this subsoil was masked by redeposited material, sometimes of considerable depth (>60cm in pit 140/60). This material was lighter, looser orange-brown sands and occasional silts, still with frequent local inclusions. There was local variation in its composition, but it clearly originated from plough wear to the ridges surrounding as well as silt movement from further afield, possibly the slopes surrounding the loch.

These rather abortive attempts to engage with the landscape of the upper Lunan Valley were abandoned after 1998. In retrospect the decision to abandon the work was premature, and further work in the Lunan would certainly bring rewards. However, in the course of a study of this kind it was felt more appropriate to continue to try new areas that held some promise, and in the following year the survey and excavation of a limited area of the Angus uplands was undertaken.

4.4: Conclusion

In conclusion the Henry collections clearly demonstrate a rich prehistoric landscape in the upper Lunan. The data from Henry's fieldwalking clearly complements the extensive crop mark and excavation record in the lower valley and also provides a context for other enigmatic sites such as Lunanhead. However the material is very difficult to interpret in terms of the character of prehistoric settlement: the Lunan certainly appears to have been occupied during the mesolithic, but this does not appear to have generated large or distinctive scatters. Geomorphic processes, exacerbated by modern agriculture, have also had considerable impacts of the Holocene landscape. In many instances land-surfaces have been buried to considerable extents, presumably burying parts of the prehistoric landscape. The full assessment of these difficulties, and therefore of the early prehistoric settlement of the Lunan requires a detailed geomorphic survey of the valley in order to identify and assess the context of archaeological material.

4.5: Notes

4.5.1: Fieldwalking

From Sunday 22nd through Thursday 26th March 1998 field walking was carried out on the farms of Mr Jollie (West Mains of Turin) and Mr MacKie (Drimmie Farm).

West Mains of Turin Field A. Centred NO 517534

Walked 22/3/98 by Graeme Warren.

Immediately to the south of the steep scarp to the hill top **WMT-A** includes two gentle east-west shelves running through the field providing panoramic views of Rescobie Loch and the through routes east and west. The ploughing had brought up large quantities of loose (?)'bed rock' (laminated mudstones), possibly because of significant quantities of soil loss from these high slopes. As a consequence of this factor visibility was poor although weather conditions were fine. Consistent very low densities of post-medieval material did suggest that artefacts should have been visible. The soil was a silty clay with lots of gravel inclusions. Quartz was also notable. Pebbles ranged from angular to rounded, small to large and from clear to milky at a density of <1 per m^2. Field walking at 5m intervals (paced) orientated north-south on the axis of the field without collecting. No artefacts were observed although a number of quartz pebbles were noted as possibly modified.

West Mains of Turin Field B. Centred NO 520534

Walked 22/3/98, 24/3/98 by Graeme Warren.

WMT-B is immediately east and adjacent to **WMT-A**. In common with it, two notable shelves extended through the field, on the lower of which a crop mark feature has been tentatively identified as a souterrain (RCAHMS 1978). The field was harrowed and sown, although not flattened. Visibility was not ideal but once more, the presence of consistent amounts of post-medieval material suggests that any substantive prehistoric activity would have been noted. The soils were akin to those in **WMT-A**, although less mudstone was present. Field walking was undertaken at 10m (paced) intervals orientated east-west, a total of twenty-one transects were walked. No artefacts were collected. On the higher shelf (lines 9-10 in particular) greater quantities of quartz was noted in the eastern half of the field, including some potential cores. In this same area much greater quantities of mudstone were found. The quality of the quartz in general increased as field walking progressed down-slope (observation made lines 16-17).

West Mains of Turin Field C centred 521530.
Walked 24/3/98, 25/3/98 by Graeme Warren.
Separated from **WMT-B** by a narrow strip of unploughed land **WMT-C** was on a quite notable concave slope, bottoming out to the south. In general **WMT-C** was less stony than either **WMT-A** or **B**, with notably fewer large quartz nodules and a number of very small quartz fragments were noted. The field had been harrowed and sown, but was not flattened. The lack of rain created some problems with dust but high amounts of post medieval material suggests that visibility was not a notable problem. Field walking was carried out at 10m paced intervals orientated east-west on the short axis of the field. Thirty-four lines were walked in total. One find was made, and recovered from line 32, at the bottom of the slope (NO52085291)

Field D centred NO 522527
not walked - permission not obtained.

West Mains of Turin Field E - centred NO 517528
walked 25/3/98 by Graeme Warren.
WMT-E differs from the OS map. The boundary marked on from NO519525 to 518529 no longer exists. **E** is also on a gentle slope and has been intensively cultivated. A considerable soil lynchet exists to the east of **WMT-E** where this field borders a field owned by Nethermuir farm. To the east of the drystone dyke separating the fields the plough soil surface is approx. 50cm higher than in **E**. The field has a sinuous slope running from north to south, with a concave ridge giving way to a convex slope. Soils are less stony than further up-slope and fewer large, coarse fragments of quartz were recorded. Field had been harrowed and sown. Visibility was poor although high densities of post medieval material were noted. Field walking was carried out at 10m paced intervals orientated north-south. A total of ten lines at the extreme east of the field were walked before this field was abandoned the next day because of flattening by the farmer. No finds were made.

Drimmie Farm Field A - centred NO 515526
walked 26/3/98 by Philippa Ascough, Jessica Camburn, Graeme Cavers, Rachel Gamble, George Geddes, Richard Grisdale, Carenza Hugh-Jones, Chris Knight, Rob McCrossan, Caroline Mathers, Lucy Verrill, James Whitehouse with supervision by A Heald and G Warren
mis-identified in the field as *West Mains of Turin Field F*
Another south facing, gently concave slope, **DF-A** lay at the same altitude as **WMT-E** but was un-harrowed and suitably weathered for field walking. Weather conditions were also highly suitable, heavy overnight rain, followed by bright skies and wind. This exercise was undertaken as training for first years. Field walking was carried out at ten-metre measured intervals, oriented east-west and beginning at the extreme south of the field. A total of nine lines were walked, 0m - 80m from the southern fence line. All of the material recovered was post-medieval or natural.

Drimmie Farm Field B - centred NO 515525
walked 26/3/98 by Philippa Ascough, Jessica Camburn, Graeme Cavers, Rachel Gamble, George Geddes, Richard Grisdale, Carenza Hugh-Jones, Chris Knight, Rob McCrossan, Caroline Mathers, Lucy Verrill, James Whitehouse with supervision by A Heald and G Warren
Misidentified in the field as *West Mains of Turin Field G*
A low ridge (*c.* 80m OD) means that **DF-B** is a north-facing slope. Soils are dark and rich, and it is possible that the ridge has caught some colluvial material from up-slope. Few detailed observations were taken as field walking was abandoned due to heavy rain and hail before the field was completed. Walking was carried out at ten metre measured intervals, north-south. Finds were mainly post medieval or natural although a small fragment of (?) chert was discovered at NO51745245.

West Mains of Turin Field G - centred NO521523
Walked Graeme Warren and Luke Burton, 9/98

WMT-G is a large field immediately above the main road. It slopes gently down hill from north to south , with a notable low ridge in the southeast (running east-west). On this ridge ploughing has disturbed considerable quantities of bedrock. Immediately to the south west lies a round barrow. Fieldwalking took place on a north-south grid following plough furrows at 10m intervals. Visibility was good, and large quantities of post medieval ceramic and quartz were recovered. A total of seven artefacts were recovered, with no particular concentrations. These included a blade core and an end of blade scraper. No artefacts were recovered from near the round barrow.

4.5.2: Rescobie test pit survey: September 1998, Soil Profiles

20/20: 8/9/98.
0-25cm: Firm granular brown sandy loam with no organic content. Moderate-Frequent small-large rounded and sub-rounded clasts (matrix supported). *Ploughsoil. Few shattered clasts* Abrupt even boundary at *c.* 25-30cm.
25-47cm: Loose granular orange-pink medium sand no organic content. Moderate small – large rounded clasts including a few erratics throughout. (matrix supported) *Charcoal and fragments throughout.*
47cm: limit of excavation.

20/40
0-25cm: Firm granular brown loam with high organic content. Moderate small-large rounded and sub-rounded clasts, including erratics throughout (soil supported). *Ploughsoil. Few shattered clasts.* Abrupt sharp boundary at *c.* 25cm .
25-50cm: Granular mixed greys, oranges, yellow v coarse sand no organic content. Frequent v small – large rounded, sub-rounded and sub-angular clasts (clast supported).
50cm: limit of excavation.

20/60
0-25cm: Firm granular brown sandy loam with high organic content. Moderate small-large rounded and sub-rounded clasts (soil supported). *Ploughsoil.* Abrupt sharp even boundary at *c.* 25cm.
25-51cm: loose granular orange-pink medium sand and gravel no organic content. Moderate - frequent v small – large rounded, sub-rounded, sub-angular and angular clasts (Clast supported) *Gravels.*
51cm: limit of excavation.

40/40: To south of ridge top. GW/PA.
0-25cm: Loose granular brown loam with well humified high organic content. Moderate-Frequent small-large (v large) rounded and sub-rounded local clasts (soil supported). *Ploughsoil* Abrupt undulating boundary at *c.* 25-30cm.
25-70cm: Loose granular orange and grey medium sand no organic content. Occasional lenses of clean sand with horizontal orange-grey bands increasing erratics with depth, at 65-70cm massive *in situ* clasts include rotting sandstone. Abundant v small – v large rounded and sub-rounded erratic local clasts. (Clast/soil supported).
70cm: limit of excavation.

40/60 No finds. 16/9/98 GW/PA
0-25cm: Firm granular dark brown loam with high organic content. Moderate small-large rounded and sub-rounded local clasts (soil supported). Clear even boundary at *c.* 25cm.
25-50cm: Loose granular orange-brown medium sand low organic content. Few - moderate small – large rounded and sub-rounded erratic local clasts. (Clast supported) Abrupt undulating boundary at *c.* 50cm.
50-58cm: Compacted granular gravel with no organic content. Abundant v small – large sub-rounded, rounded and sub-angular local clasts. (clast supported).
58cm: limit of excavation.

60/40 To south of ridge top. GW/PA

0-25cm: Loose granular brown loam with well humified high organic content. Frequent small-v large rounded and sub-rounded local clasts (soil supported). *Ploughsoil* Abrupt undulating boundary at *c.* 25cm.
25-32cm: Loose granular orange coarse sand and gravel no organic content. Abundant small – v large rounded and sub-rounded local clasts. (Matrix supported) *Subsoil.*
32cm: limit of excavation.

60/60 Top of east ridge. 2 possible Quartz finds. 16/9/98 GW/PA
0-25cm: Loose granular pale brown sandy loam with well humified high organic content. Frequent small-large rounded and sub-rounded local clasts (soil supported). *Ploughsoil* Sharp even boundary at *c.* 25-30cm.
25-39cm: loose/compacted granular orange medium sand and gravel no organic content. Abundant small – v large rounded and sub-rounded local clasts with number of rotten pebbles intact. (Clast supported) *Subsoil.*
39cm: limit of excavation.

80/40 just to southof east ridge top. 18/9/98 GW/LB
0-25cm: Loose granular brown loam with well humified high organic content. Frequent small-large rounded and sub-rounded intact local clasts (soil supported) *Ploughsoil. C*lear undulating boundary at *c.* 25cm.
25-40cm: loose granular orange-brown medium sand low organic content. Abundant small-v large (massive) rounded, sub-rounded and sub-angular intact-broken local clasts (soil supported) *redeposited?* Abrupt undulating boundary at *c.* 40cm.
40-54cm: Loose granular orange coarse sand/gravel no organic content. Abundant v small-v large rounded, sub-rounded and sub-angular broken local clasts (matrix supported) lenses of pure gravel 2mm+.
54cm: limit of excavation.

80/60 On top of east ridge. GW/CP
0-25cm: Loose granular brown sand/ loam with well humified high organic content. Frequent-abundant v small-large rounded and sub-rounded (sub-angular) mainly intact local clasts (soil supported). *Ploughsoil.* Abrupt undulating boundary at *c.* 25cm.
25-30cm: Compacted granular orange fine and medium sand no organic content. Abundant v small – v large rounded and sub-rounded local clasts. (Matrix supported).
30cm: limit of excavation.

80/80 On top of east ridge, overlooking loch. GW/CP
0-25cm: Loose granular medium brown loam with well humified high organic content. Frequent small-large (v large) rounded and sub-rounded intact local clasts (soil supported). Abrupt undulating boundary at *c.* 25cm.
15-35cm: Loose granular orange fine sand no organic content. Abundant small – massive rounded and sub-rounded some rotted *in situ* local clasts.
35cm: limit of excavation.

100/40 30m to south of ridge. GW/LB
0-26cm: Loose granular brown loam with well humified high organic content. Frequent small, medium and large rounded and sub-rounded local clasts (soil supported) *Ploughsoil.* Clear undulating boundary at *c.* 26cm.
26-40cm: loose granular brown-orange fine no organic content. Frequent small, medium and large rounded to sub-rounded local clasts (soil supported) Clear undulating boundary at *c.* 40cm.
40-77cm: Loose/compacted granular brown medium-fine sand with no organic content. Abundant small-v large rounded, sub-rounded and sub-angular local clasts (soil supported).
77cm: limit of excavation.

100/60 To immediate south of ridge. GW/CP
0-15cm: V loose granular pale brown sandy loam with well humified high organic content. Frequent small-large rounded and sub-rounded intact local clasts (soil supported). Abrupt undulating boundary at *c.* 15-20cm.

15-30cm: Compacted granular/blocky orange fine sand no organic content. Abundant small – massive rounded and sub-rounded some rotted local clasts. *Shallow ploughsoil because of deflection on large rocks that form a layer.*
30cm: limit of excavation.

100/80 Just to north of east ridge. 17/9/95 GW/CP
0-25cm: V loose granular brown fine loam with well humified high organic content. Frequent small-v large rounded, sub-rounded and sub-angular shattered local clasts (soil supported). Abrupt undulating boundary at *c.* 25-30cm.
25-37cm: Loose-firm granular orange sandy gravel no organic content. Abundant small – v large rounded, sub-rounded and sub-angular local clasts (soil supported) some rotting.
37cm: limit of excavation.

120/40 Immediately to southof ridge. Lots of 'long' grass/clover. c.f. lack of ploughsoil. *GW/LB*
0-24cm: Loose granular brown loam with well humified medium organic content. Frequent-abundant small-v large rounded and sub-rounded mainly intact local clasts (soil supported). Abrupt undulating boundary at *c.* 24cm.
24-48cm: loose granular brown-orange fine sand well humified medium organic content. Frequent-abundant small-v large rounded to sub-rounded mainly intact local clasts (soil supported). Abrupt undulating boundary at *c.* 48cm.
48-60cm: Loose/compacted granular?/platy yellow-brown fine sand with well humified low organic content. Abundant small-v large rounded, sub-rounded and sub-angular mainly intact local clasts (soil supported).
60cm: limit of excavation.

120/60 to southwest of top of east ridge. 21/9/98 SD/TP
0-18cm: Loose granular pale brown sandy-silt loam with well humified high organic content. Frequent small-large rounded and sub-rounded intact local clasts (soil supported) *Ploughsoil.* Sharp undulating boundary at *c.* 18cm.
18-29cm: loose and compacted granular orange-brown sandy gravel no organic content. Abundant v small-v large rounded, sub-rounded and sub-angular some shattered clasts (soil supported) *Subsoil.*
29cm: limit of excavation.

120/80 To west of east ridge top. 21/9/98 ART
0-30cm: Loose granular light brown loam with well humified high organic content. Frequent small-large rounded and sub-rounded intact clasts (soil supported). *Ploughsoil.* Sharp undulating boundary at *c.* 30cm.
30-43cm: Loose orange-brown medium sand with low organic content. Abundant small – large rounded and sub-rounded intact clasts (Soil supported) *Redeposited.* Sharp undulating boundary.
43-48cm: Compact-loose granular orange sand with no organic content. Abundant medium – large rounded and sub-rounded intact clasts. (matrix supported) *Natural.*
48cm: limit of excavation.

140/40 To southwest of east ridge top. 21/9/98 ART/GFG
0-20cm: Loose granular light brown loam with well humified high organic content. Frequent small-large rounded and sub-rounded intact clasts (soil supported). *Ploughsoil.* Sharp flat boundary at *c.* 20cm.
20-30cm: Fairly compact granular reddish-brown silty sand with low organic content. Frequent small – large rounded and sub-rounded intact clasts (Soil supported) *Redeposited.* Abrupt flat boundary at *c.* 30cm.
30-35cm: Compact granular orange sandy silt with no organic content. Abundant medium – large rounded and sub-rounded intact clasts. (50/50 stone-matrix supported) *Natural.*
35cm: limit of excavation.

140/60 ART/GFG/MGC
0-39cm: Loose granular medium-light brown loam with well humified high organic content. Frequent small-large rounded and sub-rounded intact clasts (soil supported). *Ploughsoil.* Sharp flat boundary at *c.* 39cm.

39cm-100cm: Fairly compact granular reddish-brown medium silty-sand medium organic content. Frequent medium – large rounded and sub-rounded intact clasts (Soil supported) *Redeposited? Only south section taken to 100cm depth.*
100cm: limit of excavation. *Context unfinished and continues.*

140/80 To west of top of main east ridge. 21/9/98 LZ/HM
0-25cm: Loose granular brown sandy-silt (loam) with well humified high organic content. Frequent small-large rounded and sub-rounded intact local clasts (soil supported). *Ploughsoil.* Sharp undulating boundary at *c.* 25cm.
25-55cm: Very loose granular reddish-brown fine sand with well humified moderate organic content. Horizontal grading 45-72cm then none. Frequent small – large (v large) rounded and sub-rounded intact local clasts (Soil supported) *Redeposited* Sharp undulating boundary at *c.* 55cm.
55-57cm: Loose/compact granular orange sandy gravel with no organic content. Layer of v large stones. Abundant small – v large rounded and sub-rounded rotten intact local clasts. (soil supported) *Natural.*
57cm: limit of excavation.

160/40 To southwest of east ridge top. 21/9/98 ART/KT/RG
0-29cm: Loose granular light brown loam with well humified high organic content. Frequent small-large rounded and sub-rounded intact clasts (soil supported). *Ploughsoil. No Finds.* Sharp regular boundary at *c.* 29cm.
29-52cm: Fairly compact granular light reddish-brown sandy silt with low organic content. Frequent - moderate small - medium rounded and sub-rounded intact and some degraded clasts (Soil supported) *Redeposited.* Abrupt regular boundary at *c.* 52cm.
52-59cm: Compact granular yellowish-orange sandy silt with no organic content. Few small rounded and sub-rounded degraded and intact clasts. (soil supported) *Natural.*
59cm: limit of excavation.

160/60 21/9/98
0-26cm: Loose granular brown silty sand loam with well humified high organic content. Moderate small-large rounded and sub-rounded local clasts (soil supported). *Ploughsoil.* Clear undulating boundary at *c.* 26cm.
26-80cm: V Loose light reddish-brown sandy silt with well humified moderate organic content. Few - moderate small – large rounded and sub-rounded local clasts (soil supported) *Redeposited? Windblown.*
80cm: limit of excavation.

180/40 21/9/98
0-28cm: Loose granular brown silty-sand loam with well humified high organic content. Moderate small-large rounded and sub-rounded intact local clasts (soil supported) Clear undulating boundary at *c.* 28cm.
28-58cm v loose granular light orange-brown sandy silt with well humified moderate organic content. Few-moderate small-large rounded and sub-rounded intact local clasts (soil supported).
58cm: limit of excavation.

180/60 to southwest of main ridge. 21/9/98 RJM/AS
0-25cm: Loose granular brown silty-sand loam with well humified high organic content. Moderate-frequent small-large rounded and sub-rounded intact local clasts (soil supported) *Ploughsoil* boundary at *c.* 25cm.
28-40cm v loose granular orange sandy gravel no organic content. Frequent v small-v large rounded and sub-rounded intact slightly degraded local clasts (soil supported) *Natural.*
40cm: limit of excavation.

160/80 to west of east ridge – still on ridge. 21/9/98 RG/RT
0-30cm: Loose granular brown sandy-silt loam with well humified high organic content. Frequent small-large rounded and sub-rounded intact local clasts (soil supported) *Ploughsoil.* Sharp undulating boundary at *c.* 30cm.

30-45cm v loose-compacted granular orange-brown sandy gravel no organic content. Abundant small-v large rounded to sub-angular intact and shattered local clasts intact rotten rocks (soil/matrix supported) *Subsoil.*
45cm: limit of excavation.

Appendix 5: Test pit survey of the Burn of Calletar

This document outlines the methodology utilised for the test pit survey of the Burn of Calletar and discusses the analysis of the lithic assemblage.

5.1: Test pit methodology

Test pits of 1 x 0.5m were excavated with the long axis aligned north-south. All test pits were de-turfed and excavated by hand in 10cm spits. All spoil was sieved at 5mm, and due to the difficulties of identifying worked quartz in the field all quartz was retained for laboratory analysis. Test pits were excavated through the extent of the topsoil before an individual soil profile and photographic record was made for each pit. One pit on each terrace was excavated beneath the topsoil in order to record the composition of the upper terrace layers. These layers were not sieved.

5.1.1: Results

A total of 5,172 pieces of quartz were recovered from test pits. Of these forty-four (0.9%) were worked or possibly worked. A further nine pieces were recovered from the structures excavated.

None of the artefacts recovered are diagnostic in terms of chronology and may date from the mesolithic period through to the Medieval.

5.2: Analysis

5.2.1: Methodology

The difficulties of analysing quartz industries are well known (Bradley 1995), but may briefly here be reiterated. Put simply, high quality stone working relies on the homogenous crystalline structure of the parent material transferring the force of the hammer blow in a predictable fashion, enabling the knapper to have good control over the outcome of her actions (Andrefsky 1998; Lord 1993; Whittaker 1994). A useful by product of these physical characteristics of high quality stone are clearly visible signatures of the knapper's craft, a bulb of percussion, conchoidal fractures, a distinctive platform. On any given piece not all of these features may be visible, but they can often provide more detailed information about the genesis of a struck lithic than its simple morphology.

Quartz has a relatively irregular crystal structure. As a consequence of this not only is quartz more difficult to knap, but it also betrays fewer of the signatures of the knapping process. Quartz sometimes fractures along planes of weakness within the parent material, leaving very under-developed bulbs of percussion on rather geometric lithics for example. Not only are the signatures hard to spot but, due to the quality of the raw material, many (although not all) quartz industries are somewhat expedient in character. They may, for example, rely on bipolar knapping in order to produce serviceable cutting edges rather than being aimed at the removal of tidy, regular flakes. Consequently the products of quartz knapping can be irregular in character and hard to spot. Quartz pebbles can be broken in a number of ways apart from deliberate knapping incidents – plough damage or during tumble episodes for example. Whilst the presence or absence of clear stone-working signatures would normally enable the analyst to assess whether the item was anthropogenic this is not always possible with quartz. Indeed modern activity can produce clear bulbs of percussion and pronounced ripples throughout a lithic.

Due to these difficulties analysing quartz artefacts cannot proceed in the same way as flint or chert industries. Alongside the difficulty of value terms such as 'regular flake' most lithics analysis attempts to minimise grey or problem areas. With quartz these certainties are not always possible, and with many artefacts it is simply impossible to definitively say whether the artefact is anthropogenic or otherwise. Consequently in the analyses that follow a category of 'possibly worked' is maintained. This includes a number of chunks and chips of quartz which betray some signs of knapping but not sufficient to certainly label them as an artefact. They are often chips or flakes, clearly differentiated from the terrace material by their raw material type and freshness, but without clear bulbs or platforms. Sometimes these items are possible cores, larger chunks with apparent removals taken from them, but these removals are not clear or definite. There is, undeniably, an intuitive aspect to these categorisations, and consequently it is one that is best made with respect to the range of locally available quartz. Although this category of 'possible' artefacts is clearly somewhat fuzzy the fact that in the analysis that follows the numbers of possible artefacts is quite closely related to the numbers of definite artefacts suggests that it is still of use.

One note of caution must be sounded. Seemingly worked quartz flakes were identified in Tr1 Str1 (*STR1.1, STR1 SF002*); both of these were of high grade quartz and displayed notable percussive evidence, *SF002* in particular looked like a fine bipolar flake. However both artefacts were recovered from topsoil immediately surrounding a large block of high quality quartz within the wall and it is impossible to discount the possibility that they are derived from this block, either by tumble or possibly during construction. The identification of individual worked artefacts is fraught with more problems than the analysis of general trends. Problems are also suggested by the appearance of apparently worked material in riverine contexts and within over-bank deposits (see below). It is difficult to interpret this material as *re*-deposited by the river, and the pieces may be no more than sports. In any case, both examples demonstrate the importance of context to the interpretation of quartz industries, and this in turn implies that sampling strategies should incorporate these concerns.

5.2.2: Results

A total of twenty-nine possibly worked and fifteen definitely worked quartz artefacts were found in the test pits and a further two flakes in Str1. These were not distributed at random, fifteen came from terrace level (TL) 2 and nine from TP27 on this level: this pit included four out of the fifteen definitely worked artefacts. In contrast no artefacts were recorded on TL 5 (see Figure 56).

Notwithstanding the differences between levels and between test pits most of the quartz recovered was similar in character; irregular chunks, flakes or bipolar cores (Figure 55) Many of these cores seemed to result from attempts to split pebbles of varying sizes (the smallest was 22mm in maximum dimension). At times removals had flaked away from both ends of the core, at other times the removals only originated from the upper part of the core. Very few regular flakes have resulted from this process. This may either reflect the fracture characteristics of the quartz or that the flakes were taken away for use elsewhere. The majority of regular flakes were recovered from the lowest terrace, or the riverbed (see below). Those on the lowest platform included *32.2*, a small regular flake with a very well defined platform and clear percussive evidence. Other regular flakes in this area were very small, seemingly fragile items. One interesting artefact is *18.1* (*SF.001*) a large chunk (86 x 84 x 46mm) of high-grade quartz with bifacial removals from one edge. This may be a core but given the repeated nature of some of the removals, and the ergonomic character of the stone it may also be a crude chopping tool. There are some hints of edge damage but macroscopically it is impossible to further identify the character of these.

There were slight differences in the types of material utilised on differing terraces. In particular the debris found in TP27 (Level 2) includes a fine-grained grey-white quartz with a tendency towards planar fractures. This is notable in two bipolar cores (*27.3*, *27.4*) and a number of smaller chips and chunks. Also on this terrace two refitting fragments of grey-white quartz were identified (*38.2*, *38.3*), seemingly the remains from an episode of bipolar knapping. The higher densities of material on TL 2 and the consistent character of the material found are strongly suggestive of in-situ knapping.

Reasonably high densities of material are also found on TL 1 and one of our clearest artefacts (**32.2**) was discovered stratified at 30cm within overbank silt deposits and it seems very unlikely that it can be *in situ.* Alongside this several other definite or possible artefacts were discovered on the lowest terrace. Significantly these all came from test pits excavated near the river bank, those excavated away from the river revealing no worked or possibly worked quartz. This suggests that the material within TL 1 is not derived from up-slope as a colluvial deposit from TL 2 but was deposited by the river. An examination of the material within the modern day riverbed revealed that possible flakes and cores were present. It is not, however, clear where this material is derived from and some real doubts must be expressed about this material (see above).

Outside of the slight concentration identified on TL 2 there is little evidence of any *in situ* knapping deposits. The low frequency (at just less than 1%) of worked amongst natural material is probably indicative of background levels of stone-working activity, but may also reflect the difficulty of differentiating worked and natural quartz. Possibly 1% of any given quartz-rich terrace will look worked if an analyst spends enough time examining it.

A small number of artefacts were recovered from the structures identified. Those from Str1 have already been discussed. From topsoil within the interior of Structure 2 a group of seen quartz chunks and chips were identified. Although none of these were indisputably worked the fragments form a coherent group in terms of raw material. This undoubtedly weak evidence provides little assistance in terms of dating the structure. A find of a coarse quartzite rich hammer-stone was made from the topsoil to the outside of this structure (*SF.003*). This stone measured 90 x 77 x 58mm and was notably pockmarked at both ends. The hammer-stone is undiagnostic.

5.3: Conclusions

The test pit survey at Braco has revealed a low level of quartz working on a low-lying terrace with a double-faced stone wall. None of the artefacts recovered were diagnostic, being dominated by crude bipolar cores and irregular flakes. Clearly worked artefacts were found within the riverbed and in over-bank deposits on the lowest terrace, suggesting that considerable redeposition of material is ongoing. A few quartz artefacts were found in association with the two structures identified, these are either of dubious origin or do not help to date the structures.

5.4: Classification of terrace quartz.

The following brief notes outline the variable quartz composition of the nine terrace levels identified and surveyed. This also includes a description of the composition of the modern riverbed (see discussion above).

River Level
Total number of clasts (including worked and possibly worked fragments): 89
Number of possibly worked flakes: 1
Number of worked flakes: 1
The material with the gravel bed of the modern river varied widely in type, from milky white quartz through rose and honey tinted quartzites. In general the material was lightly rolled, although some broken heavily water-rolled pebbles were present. The clasts ranged from small to large in size, and were generally sub-rounded or sub-angular in shape.

Terrace Level 1. (TP 32, 33, 34, 35, 36, 37)
Total number of clasts: 744
Number of possibly worked flakes: 6
Number of worked flakes: 3
Although ranging widely in type the material within this terrace was dominated by many small fragments of medium-high quality white quartz. Also significant was a range of well-rounded fragments of river pebble and very large chunks of quartz of a variety of qualities. In particular the higher levels of the test pits were dominated by smaller material, perhaps reflecting the mechanical power of the overbank deposition.

Terrace Level 2. (TP 26, 27, 28, 29, 30, 31, 38)
Total number of clasts: 1319
Number of possibly worked flakes: 11
Number of worked flakes: 7
The material on this terrace ranged from small to large in size and is very mixed in character, the quartz varying from milky white crystalline material through to platy grey examples. Very rounded smashed river pebbles were significant, as were a few degrading low quality quartzes. The presence of distinctive worked material has already been noted.

Terrace Level 3. (TP 23, 24, 25)
Total number of clasts: 95
Number of possibly worked flakes: 0
Number of worked flakes: 1
There was a notable lack of small quartz on this terrace which was dominated by the presence of a few medium and large chunks of fairly high quality grey platy quartz.

Terrace Level 4. (TP 19, 20, 21, 22)
Total number of clasts: 603
Number of possibly worked flakes: 3
Number of worked flakes: 0
The quartz on TL 4 was very varied in character, including rosy quartzites as well as higher quality crystalline material. Most of the material was sub-angular or sub-rounded in character and very little of it was fresh. Generally the material was small in size with only the occasional larger inclusion.

Terrace Level 5. (TP 15, 16, 17)
Total number of clasts: 284
Number of possibly worked flakes: 0
Number of worked flakes: 0
The material in TL 5 was generally small and sub-rounded or sub-angular in character although rare large or very large blocks of low grade quartz were also present.

Terrace Level 6. (TP 10, 11, 18)

Total number of clasts: 441
Number of possibly worked flakes: 0
Number of worked flakes: 1
The material within TL 6 was rolled in character and was mainly comprised of small and occasionally medium fragmentary low-grade quartzes.

Terrace Level 7. (TP 3, 4, 5, 6, 7, 8, 12)
Total number of clasts: 1046
Number of possibly worked flakes: 7
Number of worked flakes: 1
TL 7 was comprised of varied types of quartz, ranging from milky-white through to platy grey. Dominated by smaller and sub-angular material the terrace also included larger more rounded material. In general the material was surprisingly fresh, often rather shiny and not seemingly water rolled, this may be coherent with a Lateglacial or early Holocene date for terrace.

Terrace Level 8. (TP 2, 9, 10, 11)
Total number of clasts: 432
Number of possibly worked flakes: 2
Number of worked flakes: 2
TL 8 was full of varied types of quartzes although dominated by white crystalline material with very occasional homogenous milky pebbles present. It was notably more rolled than the material from TL 7 beneath it. The quartz ranged from sub-angular to sub-rounded in type and was frequently small.

Terrace Level 9. (TP 1, 39)
Total number of clasts: 119
Number of possibly worked flakes: 1
Number of worked flakes: 0
TL 9 contained small to large irregular sub-rounded and sub-angular pebbles of white medium grade quartz, occasionally with veins running throughout it. Often this material looked fairly fresh in character, and not extensively water rolled or abraded.

Appendix 6: Catalogue of waisted pebbles

Unless stated otherwise all measurements are in mm or grams. Dimensions are given in length, breadth and depth. Entries in brackets are the width at the notches – not recorded for all artefacts. Museum catalogue numbers followed by a decimal point are subdivisions of a catalogue reference. For example NMAS: BG439 includes 13 artefacts, here divided as BG439.1, BG439.2 etc. The catalogue is structured by Museum reference numbers, not by sites.[14] Wherever possible the artefact is described with the catalogue number facing the observer.

6.1: National Museum of Scotland

AK256: 46 x 30(23) x 13mm, 23g
Fairnington, 1914: 1951, 271
Very small waisted pebble. Sub-oval pebble of red, water-rolled sedimentary material. Righthandside (RHS) notch above apex and confident, more invasive to rear *c.* 15 x 3mm. Lefthandside (LHS) notch also above apex but very weak with small 2nd notch (?damage) immediately above. Light abrasion in RHS notch. No plough damage.

AX61: 105 x 85 x 19mm, 232g
Bemersyde
Curle collection
Water rolled sub-triangular/oval pebble. Two mainly opposed large notches both bifacial. Abrasion on one notch. Slight plough damage.

AX62:104 x 75 x 12mm, 225g
Bemersyde
Curle collection
Water rolled pebble. Thin oval with concave slightly underside. Two opposed notches each with one heavy flake and smaller trimming from other face. Both notches abraded. No other edge damage.

BG439.01: 80 x 58(52) x 19mm, 132g
Bemersyde,
CJ Brown Collections
Sub-oval water rolled fine-grained sandstone/greywacke. Two notches, offset and below centre of pebble. LHS notch very light *c.* 12 x 2mm and lightly abraded; RHS notch much more confident, partly positioned at apex of one side with flakes from both side Clear abrasion in the centre. No edge damage and very light plough damage.

BG439.02: 88 x 62(50) x 22mm, 162g
Bemersyde,
CJ Brown Collections
Rather battered and coarse looking waisted pebble on a sub-oval brown pebble with two notches offset high above the centre, but quite parallel and comparable. LHS notch 22 x 5mm, more invasive to front over thick part of stone lightly abraded throughout. RHS 32 x 5mm also abraded and with extensive flake scar to front. Massive edge damage to base: series of small nicks, presumably caused by the plough.

BG439.03: 104 x 58(45) x 14mm, 123g

[14] Museums approached but with no waisted pebbles: Peebles, Dumfries, Marischal.

Bemersyde,
CJ Brown Collections
Fine long oval waisted pebble on a grey, fine-grained sedimentary water-rolled pebble. Both notches sit at curved apex of their sides slightly offset above the centre of the artefact. LHS notch 20 x 3mm and quite shallow, flake rises gently to the front, and terminates rapidly at the back. Abraded throughout. RHS 16 x 4mm clearer flakes and stronger abrasion. Plough damage extensive.

BG439.04: 87 x 68(53) x 14mm, 131g
Bemersyde, B I 1137
CJ Brown Collections.
Slightly irregular shaped waisted pebble on thin disc-like pebble of reddish sandstone, sub-oval. LHS notch very sharp and geometric. Flake scars extensively into the upper of the pebble with clear step terminations. Very centre of the notch notably abraded by some fine (?)cord, RHS notch obscured by a later break, but appears to have been a confident notch in thick part of the artefact with notable abrasion to the centre. Recent break of one of the notch edges above this, and very old damage to the base are notable as is plough damage.

BG439.05: 100 x 59(42) x 17mm, 136g
Bemersyde, B I 1083
CJ Brown Collections
Irregular sub-oval water rolled grey fine-grained rock with two large notches slightly offset and not opposed at centre. Also possible third notch at top, but irregular, and fresh and possibly best understood as damage. LHS notch semi-circular (22 x 5mm) with very extensive stepping flake terminations to rear, lightly abraded. RHS notch less extensive fractures but also abraded (23 x 6mm). Plough damage all over and as well as probable damage to the apex a small area of blunting abrasion near base is notable.

BG439.06: 113 x 73(53) x 22mm, 249g
Bemersyde, B I 1136
CJ Brown Collections
Classic large heavy waisted pebble on grey-brown sub-oval pebble. Two notches at centre, opposed. Both well defined, with more invasive scars to the rear. LHS notch 24 x 9mm, and very lightly abraded. RHS 21 x 9mm with good upper scar. Notch very abraded. Light plough damage and no edge damage.

BG439.07: B II 470: 106 x 82(61) x 16mm, 185g
Bemersyde, B II 470
CJ Brown Collections
Rather unusual waisted pebble on a very thin large water-rolled pebble of fine-grained red-pink sandstone. RHS notch at apex of a convex side is fine, but LHS may have collapsed in manufacture and may have a later break. LHS clear flake scar to rear and notable cord abrasion to top but towards base hints of other flakes or breaks are hard to read. RHS simple bifacial flake scars, *c.* 37 x 10mm. Also edge damage to base where a large scar is visible and light plough damage across the artefact.

BG439.08: 61 x 35(30) x 14mm, 40g
Bemersyde, B II 869
CJ Brown Collections
Small waisted pebble on a fawn coloured fine-grained sandstone pebble. Sub-oval/triangle in shape with RHS notch on apex opposing LHS notch. LHS notch very light, with bifacial

scars. Light abrasion. RHS notch more invasive to rear, also lightly abraded. No edge damage or plough damage.

BG439.09: 102 x 69(54) x 24mm, 224g
Bemersyde, B III 466
CJ Brown Collections
Classic large waisted pebble on heavy, coarse greywacke/sandstone. Sub-oval in shape with two opposed removals, RHS above LHS which is at apex of gentle convex side. LHS thick section and short curving flake scars, 24 x 8mm. Not v abraded. RHS larger stepped flake fracture to the front, shorter to rear, also notable abrasion in the centre. A rather robust stone that will not show wear well. Very slight edge damage to ends and plough.

BG439.10: 77 x 63(52) x 21mm, 151g
Bemersyde, B III 467
CJ Brown Collections
Classic waisted pebble on a water rolled grey sandstone. Two opposed deep notched at apexes of sub square pebble. LHS notch 16 x 5mm possibly bifacial in a chunky bit of the pebble. RHS notch 21 x 6mm and more triangular but less invasive flake scare. Both notches abraded in the centre. No edge damage, no plough damage.

BG439.11: 99 x 56(43) x 8mm, 126g
Bemersyde, B III 467
CJ Brown Collections
Rather irregular waisted pebble with two notches opposed and slightly offset. LHS near the apex of a convex side, RHS below centre of more irregular face. Also RHS a large notch/flake at top, caused by damage. LHS notch (24 x 8mm) not clear flakes, notably abraded in the centre. RHS notch notable flake to front with gentle step termination (18 x 6mm). Extensive plough damage, and notwithstanding the damage noted above there are a few other nicks and ticks.

BG439.12: 100 x 66(46) x 17mm, 189g
Bemersyde, B III 895
CJ Brown Collections
Classic waisted pebble with two well defined opposed notches on a sub-oval red-pink fine-grained sandstone. LHS notch more defined to rear 33 x 10mm with notable abrasion in the centre. RHS notch also much more extensive to rear 30 x 9mm also very abraded. No edge damage and light plough damage.

BG439.13: 112 x 83(67) x 21mm, 263g
Bemersyde,
CJ Brown Collections
Large classic waisted pebble on a grey sub-oval pebble. Two notches, opposed and slightly above centre. LHS notch bifacial but more notable on upper level, 24 x 7mm. RHS slightly more irregular due to irregular 3rd and 4th notches above it – probably edge damage but possibly repeated flakings Heavily abraded throughout. Light plough damage and a few end nicks.

BG440.1: 102 x 60(46) x 12mm, 111g
Dryburgh, 'D I 650',
CJ Brown Collections
Very fine-grained haggis rock/conglomerate. Sub-oval with two notches, one on straight side and one on apex of triangle. Both notches have removed upper face of artefact, almost completely removing this surface, rear is still smooth. LHS notch large shallow and irregular

with stepping fractures. Notable abrasion in the centre. RHS notch at apex is also large, if rather blunt due to the morphology of the pebble here. This notch is slightly fresher, and has an irregular surface. Small flake of edge damage from base and no plough damage.

BG440.2: 56 x 37(32) x 18mm, 52g
Dryburgh, 'D II 438'
CJ Brown Collections
Small classic waisted pebble on a sub-oval/triangular water rolled fine-grained sandstone. Cross section of pebble is not flat, but slightly raised to an angle in the centre. LHS notch mainly invasive on upper level but partly on rear in centre, possible abrasion in the centre. RHS notch also more invasive to upper level (n.b. the shape of this pebble may partly guide blows in a certain direction). No edge damage, very light plough damage.

BG440.3: 96 x 69(13) x 14mm, 125g
Dryburgh, 'D II 472'
CJ Brown Collections
Sub-oval/square water rolled pebble of fine-grained sandstone with two almost opposed notches. LHS notch is shallower (27 x 5mm) and more extensive to rear where flawed terminations are visible on the flake. RHS notch is larger and deeper, partly because of pebble morphology and has clear flake scar patterns extending into the rear of the artefact. Flake removal also clearly visible on the front. LHS notch abraded throughout, RHS in centre. Heavy plough damage over all of artefact, no edge damage.

BG440.4: 82 x 59(42) x 15mm, 101g
Dryburgh, 'D II 543'
CJ Brown Collections
Sub-oval greywacke water rolled pebbles with two large notches to sides and one possible notch (although less abraded than other notches to base). Morphology of pebble gives this artefact a very squat feel with most of the weight below the notches. LHS notch *c.* 26 x 6mm, even fractures. RHS notch large and mainly on the front face (20 x 6mm), lightly abraded. Basal notch rather irregular and mainly to rear. Edge damage possible extra notch, and small nick to top, light plough damage.

BG440: 91 x 76(66) x 20mm, 214g
Dryburgh, 'D II 1002'
CJ Brown Collections
Coarse-grained water rolled pebble with two or possibly three notches. Sub-oval/circular shaped pebble with all notches offset to the top. LHS notch very shallow, poorly developed fracture morphology and notable abrasion in centre. RHS also poor fracture but no abrasion. Possible notch to the top is more invasive and has collapsed the top of the pebble. Unclear that this is a notch and not breakage from dropping. Moderate plough damage all over: little edge damage.

BG440.5: 97 x 76(58) x 20mm, 224g
Dryburgh, 'D II 1005'
CJ Brown Collections
Sub-oval/sub-triangular pebble of fine-grained greywacke with two opposed notches, one on apex of triangle (RHS) one on one side (LHS). LHS notch very deep curving notch, must have been made by at least two blows and flake morphology supports this contention. Flake scar more extensive to the rear. Abrasion in centre. RHS simple notch, possibly from one blow. More extensive to rear, notable abrasion in the centre. Very light plough damage and no edge damage

BG440.6: 72 x 56(47) x 14mm, 84g
Dryburgh, 'D II 1017'
CJ Brown Collections
Classic type waisted pebble on sub-oval water-rolled pebble of grey sandstone. Two slightly offset notches just above centre giving a slight swelling feel to the artefact itself. LHS notch (18 x 5mm) more invasive to upper and with possible cord mark in the centre. RHS more irregular notch, possibly formed by more than one blow/crushing on a chunkier section of pebble. Possible abrasion. Abrasion to top of artefact, and edge damage flake to base. Also light plough damage.

BG440.7: 116 x 49(43) x 20mm, 165g
Dryburgh, 'D II 1047'
CJ Brown Collections
Unusual texture and shape waisted pebble. Overall shape is boomerang like with shallow notches at apex. Texture is a little soapy – a very fine-grained sandstone. LHS notch light and below the centre of concave face of pebble. Flake morphology obscured by abrasion and wear. Some possible core abrasion. RHS notch on and below apex of convex. More confident notch, with small flake scars. Little plough or edge damage.

BG440.8: 82 x 60(56) x 17mm, 133g
Dryburgh, 'D II 1336?'
CJ Brown Collections
Sub-triangular water-rolled sandstone pebble with two opposed notches. LHS notch towards base of straight face mainly removed from rear with very light step termination. Shallow notch, with abrasion in centre. RHS notch at apex of triangle, mainly to front, notable abrasion to the top of the notch. Small edge damage damage/secondary notch above LHS – maybe a slight mishit. Small chip missing from top. Light plough damage

BG441.1: 84 x 52(44) x 26mm, 111g
Rutherford. Maxton, 'R IV 1027'
CJ Brown collection
Medium, chunky waisted pebble on grey coarse sandstone. Sub-oval-triangular pebble with two opposed notches. LHS notch deep and square in section, lightly abraded. RHS notch more invasive flake scar on upper surface, clearly stepped at the termination. Small flake of edge damage at base, very light plough damage.

BG441.2: 92 x 61(50) x 24mm, 181g
Rutherford. Maxton, 'R IV 1166'
CJ Brown collection
Haggis rock waisted pebbles. Large heavy sub-oval/triangular water rolled pebble with two opposed notches. LHS unusual short fracture across rather chunky section of the artefact, RHS flake very invasive to rear. Possible abrasion at base, Possible edge damage to base and tip but material is unusual and this is hard to ascertain clearly.

BG441.3: 79 x 53(43) x 11mm, 62g
Rutherford. Maxton, 'R IV 1167'
CJ Brown collection
Triangular and angular shaped waisted pebble on coarse water rolled pebble with two large, rather unusual notches located towards base of artefact. LHS notch more intrusive to rear, and quite abraded in the centre. RHS rather unusual, irregular fracture, also lightly abraded. No edge damage and very light plough damage.

BG442: 51 x 40(36) x 8mm, 26g
Fairnington, 'F ... 48?'
CJ Brown collection
Small thin waisted pebbles with classic morphology and shallow notches. Very fine sub-oval light grey sandstone. LHS notch rather irregular and highly abraded, RHS more confident 'sharper' notch. Minimal edge damage an v light plough damage.

BG443.01: 86 x 66(59) x 21mm, 181g
Unknown, Munro collection, possibly Dryburgh
Classic waisted pebble. Sub-oval two opposed notches. LHS notch shallow 25 x 4mm, RHS notch more invasive, especially on upper surface 20 x 5mm. Possible abrasion in centre of RHS. Light edge damage to top.

BG443.02: 99 x 46(40) x 15mm, 109g
Unknown, Munro collection, possibly Dryburgh
Fine-grained sandstone sub-oval with greater curve to LHS. Two notches slightly below centre and not parallel, R is lower. LHS 19 x 4mm much more invasive to rear, with slightly unusual fractures RHS flakes from both sides, 22 x 5mm. Possible abrasion in centre, light plough damage.

BG443.03: 100 x 55(54) x 18mm, 159
Unknown, Munro collection, possibly Dryburgh
Very shaley rock, sub-oval pebble with two shallow opposed notches. LHS notch is very (suspiciously?) fresh, clearly formed by two blows in the same direction with possible light removal from the upper surface 33 x 3mm. RHS 'notch' is very abraded, and with no clear flake morphology 28 x 3mm. Light plough damage and nicks at top.

BG443.04: 81 x 76(67) x 18mm, 183g
Unknown, Munro collection, possibly Dryburgh
Sub-square grey sedimentary water rolled pebble with two notches on opposed sides. Also small, irregular notch to left of top, probably caused by damage, and a little fresher than other examples. LHS notch 16 x 3mm more invasive to upper surface than lower. No clear abrasion but this is a recalcitrant rock with much quartz RHS 22 x 4mm clearer flake to rear. Plough damage: none. Edge damage: none apart from that noted.

BG443.05: 80 x 65(57) x 19mm, 138g
Unknown, Munro collection, possibly Dryburgh
Unusual pebble which was possibly split (?naturally split?) before use, as rear is very much fresher than upper. Two notches offset above centre. LHS notch 33 x 3mm quite extensive flake scar to rear, smaller to surface. RHS 16 x 4mm extensive scar to rear with notable step termination. Light wear to LHS notch. Plough damage: no. Edge damage: no.

BG443.06: 90 x 65(58) x 22mm, 172g
Unknown, Munro collection, possibly Dryburgh
Sub-oval/triangular pebble with two notches offset above centre and not level. Also notch of recent damage at base. LHS notch off 25 x 7mm apex of tri. inv. to upper and rear w light abrasion. RHS bifacial, worn 25 x 4mm. Plough damage very light. Edge damage none apart from noted.

BG443.07: 92 x 78(64) x 22, 188g
Unknown, Munro collection, possibly Dryburgh

Brown coarse sub-oval/triangular sandstone pebble with two notches: RHS at apex, above LHS. LHS notch 23 x 5mm invasive to rear, present on top. RHS 29 x 5mm invasive to rear and directed well into body of stone before hinge termination. Plough damage: light-moderate. Edge damage: light – many small nicks (cf. plough).

BG443.08: 84 x 65(58) x 12mm, 97g
Unknown, Munro collection, possibly Dryburgh
Thin sandstone with two large notches. RHS above LHS. LHS very invasive to rear, possibly more than one blow: 28 x 10mm. RHS also very invasive to rear and more irregular. Abrasion LHS but not RHS. Edge damage to top, no plough damage.

BG443.09: 84 x 73(63) x 14mm, 125g:
Unknown, Munro collection, possibly Dryburgh
Doubtful? Sub-oval grey sandstone pebble with two notches. LHS notch very irregular and may be natural. RHS notch two possible small blows. Both sides notably abraded and this might be a natural stone that can be used in this way. Light plough damage and no edge damage.

BG443.10: 76 x 39 x 19mm, 79g
Unknown, Munro collection, possibly Dryburgh
Thick elongated pebble with two very light notches mainly into the same surface. LHS notch formed by >1 blow, short nibbling efforts, RHS notch larger and more confident. Both alterations are very minor. Clear abrasion in LHS. No plough or edge damage.

BG443.11: 82 x 49(39) x 14mm, 76g
Unknown, Munro collection, possibly Dryburgh
Sub-oval/square waisted pebble with two notches offset. LHS notch at apex: *c.* 14 x 5mm deep circular section. RHS more irregular, possible double hits and thicker section of the pebble. Light plough and minor edge damage

BG443.12: 73 x 59(34) x 9mm, 54g
Unknown, Munro collection, possibly Dryburgh
Rather unusual waisted pebbles (see **BG441**: 'R IV 1167': similar odd morphology). Thin disc like pebble with two large notched to base almost forming a tang. Notches are very unusual in type as well, not clearly flake scars these are much more like snaps - or possibly a product of an almost vertical blow into such a thin pebble. Notches are towards base and are both abraded to the centre. Plough damage is very light

BG443.13: 58 x 43(39) x 11mm, 42g
Unknown, Munro collection, possibly Dryburgh
Small fine sub-oval-sub triangular pebble with two light notches. LHS *c.* 22 x 3mm more invasive to rear, RHS at apex of side, 24 x 4mm bifacial. Light abrasion in both. No plough damage.

BG443.14: 89 x 54(14) x 13mm, 98g
Unknown, Munro collection, possibly Dryburgh
oval fine-grained pebble with two or possibly three notches. LHS 20 x 6mm deep notch (w. abrasion?) very invasive to surface. RHS 16 x 5mm invasive to rear. Notches and flake fall exactly as you would tossing a pebble round in the hand. Notch at top is as abraded as the others if rather shallow. Difficult to assess but probably anthropic. Light plough damage, no edge damage

BG443.15: 72 x 60(53) x 22mm, 135g
Unknown, Munro collection, possibly Dryburgh
Two notches on large thick grey coarse pebble. Large area of breakage to the top where the upper left corner is missing. Fresh break. LHS shallow *c.* 23 x 3mm abrasion in centre. RHS large invasive scar to rear. 23 x 7mm. Abrasion in centre. Light – moderate plough damage and no edge damage.

BG443.16: 86 x 52(46) x 18mm, 110g
Unknown, Munro collection, possibly Dryburgh
Fine-grained elongated sub-oval pebble with two notches below the centre. LHS notch clearer to rear, across chunkier section of the pebble. RHS much more irregular lower notch as unusual flake morphology (better to the top) and is well abraded. Small nick immediately above this is fresher. Very light edge damage (although one nick above RHS notch) and no plough damage.

BG443.17: 98 x 53(42) x 12mm, 87g
Unknown, Munro collection, possibly Dryburgh
very fine-grained elongated sub-oval pebble with two notches near the wider end. Notches slight offset (RHS above LHS). LHS neat bifacial notch (*c.* 18 x 3mm) quite invasive to both sides, possibly three blows. Also abraded. RHS invasive to upper with notable step fracture. Very weak flake facets on rear. Also abraded in the centre. Light plough damage; light edge damage, especially at the base.

BG443.18: 118 x 60(51) x 29mm, 324g
Unknown, Munro collection, possibly Dryburgh
Very coarse-grained elongated sub-oval thick-sectioned pebble with tow rather light, thick notches. Both notched above centre. LHS notch shallow flake scars to both sides. Slightly larger, and stepped, to rear. Possible light abrasion in centre, but material is not sympathetic here. Light plough and edge damage

BG443.19: 104 x 71(62) x 20mm, 200g
Unknown, Munro collection, possibly Dryburgh
Fine-grained sub-oval/square pebble with a slightly hollowed underside. Two notches, RHS above LHS. LHS notch light, even and bifacial (*c.* 19 x 5mm). RHS also even but both blows are more invasive, Slightly abraded in the centre. Light edge damage to top and left upper. Light plough damage

BG443.20: 109 x 74(58) x 22mm, 230g
Unknown, Munro collection, possibly Dryburgh
Medium-coarse grained pebble with two notches. LHS so irregular that it is impossible to assess the original location of this notch. LHS irregular notch. Rear flake aiming into the body of the pebble with a massive step termination. Smaller flake in centre of upper with possible light abrasion. RHS (*c.* 24 x 10mm) neat notch more invasive upper-side, small modification to rear, Abraded in the centre. Extensive plough damage and edge damage including large flake immediately above LHS notch.

BG443.21: 117 x 72(62) x 25mm, 300g
Unknown, Munro collection, possibly Dryburgh
medium-fine-grained sub-oval pebble with two notches slightly below the centre. LHS more invasive to the rear (*c.* 27 x 5mm). RHS very small, bifacial. Very extensive plough and edge damage including deep gouges and many nicks. RHS large notch immediately above the real

notch is clearly plough damage ass groove is dragged away from it. Flake from this damage obscures RHS notch

BG443.22: 104 x 76(64) x 19mm, 203g
Unknown, Munro collection, possibly Dryburgh
Large thin sub-oval/square pebble with two confident and offset notches RHS above LHS. LHS large notch *c.* 35mm wide more invasive to upper surface, underside small flakes. Light abrasion. RHS (32mm) invasive to rear but with clear flake to the front. Moderate plough damage to underside and fresh notch at base, but otherwise little damage.

BG443.23: 118 x 61(51) x 20mm, 181g
Unknown, Munro collection, possibly Dryburgh
Soapy, fine-grained greywacke pink coloured to top, grey on base. Two (?three) notches. LHS notch neat (22 x 5mm) neither flake is large, but more notable to rear, upper is steep. RHS (upper) similar to LHS steep notch with few invasive scars, Also slightly more invasive to rear. Below this is a very shallow 'notch', highly abraded with no morphological features. Light plough damage and edge damage.

BG443.24: 96 x 80(58) x 15mm, 175g
Unknown, Munro collection, possibly Dryburgh
Fine-grained sub-oval/square with two very large notches almost forming a tang. However no edge damage coherent with this type of use. LHS *c.* 30mm flakes are both light, more invasive to upper, underside more steep blunting. RHS shallower notch, invasive to rear. Light plough damage and edge damage.

BG443.25: 199 x 65(53) x 34mm, 318g
Unknown, Munro collection, possibly Dryburgh
Fine-grained sandstone but a large irregular pebble slightly twisting a top. The two notches are both irregular, especially to the RHS. LHS large shallow flake from the front with medium-heavy, stepped, flake from the rear and other possible small blows. RHS marked notch: even narrow and deep flakes on both sides. Moderate plough and light edge damage.

BG443.26: 108 x 68(60) x 25mm, 254g
Unknown, Munro collection, possibly Dryburgh
Fine-grained very smooth sub-oval rather pointy pebble with two clear, if shallow, notches. LHS notch: very faint, caused by >2 blows on opposed faces. 18 x 2mm only a minor alteration to the pieces, abraded. RHS large, confident flake to the front, not so clear to the rear. Light plough damage includes two very fresh scars to the rear and one faint fresh notch caused by this. Edge damage otherwise minimal

BG433.27: 97 x 59(49) x 17mm, 144g
Unknown, Munro collection, possibly Dryburgh
dark grey fine-medium grain sub-oval pebble. Two notches towards top of pebble. LHS more complex and lower than RHS. LHS main part of notch to the top, both flakes steep but more invasive to rear, slightly scar immediately below this notch may be damage. Light abrasion. RHS very clear flake to rear, weak to font, light abrasion in centre. Extensive plough damage including fresh scars. Light edge damage.

BMA2036: 121 x 65 x 17mm, 181g.
Rink Farm
Water rolled pebble. Sub-triangular. Two large bifacial notches *c.* 35 x 10mm. Extensive edge damage to the broad end, none to the point. Possible rope/twine mark in LHS notch

(also possible plough damage). Extensive plough damage. Very ergonomic in hand as 'chopper' – edge damage at correct end for this use. ?waisted pebble

BMA2037: 105 x 48 x 23mm, 205g.
Rink Farm
Water rolled pebble. Sub-rectangular. Two bifacial large notches *c.* 45mm from base. No edge damage at ends. Notches lightly abraded.

BMA2038: 100 x 51 x 14mm, 132g
Rink Farm
Water rolled pebble. Thin oval. Two opposed notches 55mm from base. Notches small and lightly abraded. Chip missing from LHS near base. Impossible to ascertain reason for this. Minimal plough damage.

BMA2039: 82 x 49 x 13mm, 90g
Rink Farm
Water rolled thin oval pebble. Two opposed notches in centre of stone. RHS bifacial, LHS unifacial (one confident blow). Very small amount of edge damage to one end is probably not significant. No evidence of abrasion on notches.

BMA2040: 80 x 55 x 16mm, 109g
Rink Farm
Water rolled oval pebble with two opposed notches in centre. Both bifacial. Slight abrasion to notches. Slight edge damage at base. Possible area of polishing/smoothing at tip (also possibly natural).

BMA2041: 80 x 52 x 15mm, 97g
Rink Farm
Water worn sub-oval pebble with two notches. RHS notch v large *c.* 45 x 15mm (min. depth) bifacial and very steep not invasive. LHS notch bifacial and less steep. Both notches heavily abraded.

BMA2580: 82 x 53 x 13m, 82g:
Rink
Helen Mulholland's excavations.
Water rolled pebble. Oval. Notches highly abraded, RHS possibly a natural notch. LHS hints of flake removal.

BMA2581: 96 x 63 x 22mm
Rink
Helen Mulholland's excavations
Doubtful waisted pebble. Water rolled pebble. Very irregular. Possible crude unifacial notches rhs. Better bifacial notch LHS. No clear abrasion.

BMB20: 109 x 77(59) x 23mm, 158g
Dryburgh
Unknown collector
large medium-fine-grained sub-oval-sub triangular grey coloured greywacke/sandstone, two notches set to the top, which is wider and heavier than base of artefact. LHS notch is very large, *c.* 25 x 7mm. Neat semicircular shape with notable abrasion. Invasive scars to both rear and upper, but upper more invasive and stepped. Abrasion at greatest in the centre. RHS

notch also semi-circular 25 x 8mm both scar less invasive than LHS, greater to the rear. Very light plough damage and no edge damage.

BMB21: 87 x 55 x 25mm, 158g
Dryburgh
Unknown collector
Water rolled chunky oval pebble. Two opposed large bifacial notches. Abrasion to rhs, not to lhs (cruder notch). Light plough damage, v light edge damage to base (crushing).

BMB390: 27 x 20 x 3mm, 3g
Dryburgh
Unknown collector
Thin water rolled disc. Oval. Two notches *c.* 5 x 2mm deep. Light wear to the notches. ?shale bead?

BMB427: 152 x 111 x 32mm, 673g
'Top East Field 28/2/45 Plough' Dryburgh
Lamb/Stewart collection
Water rolled pebble. Sub isosceles triangle. First notch at centre of base. Second notch formed by two irregular, large removals to right of point of triangle. Smaller possible third notch on lhs, very weak, mainly notable by abrasion. Little plough damage. Possible evidence of abrasion. First and third notch notably abraded. Also band of abrasion/pecking running around centre of stone, originating from notch one but not aligning on either notch two or three. May be abrasion due to a rope of some kind possibly due to natural sedimentation of the sandstone. Unclear as to use.

BMB429: 142 x 56 x 21mm, 220g
Dryburgh
Lamb/Stewart collection
Water rolled sub-oval pebble, one mainly straight side (rhs) one gentle concave. Two notches, both bifacial but with one dominant removal. RHS central, LHS above apex of curve. Rhs lightly abraded. Extensive plough damage. Flakes removed by damage to both ends.

BMB430: 131 x 56 x 31mm, 337g
Dryburgh
Lamb/Stewart collection
Water rolled chunky oval pebble. Two opposed notches off-centre to base of artefact. Notches bifacial and uneven, LHS notch includes very invasive shallow flake. Possible cord abrasion to both notches. Light edge damage to both ends (?hammer) and extensive plough damage.

BMB431: 98 x 62 x 26mm, 268g
Dryburgh
Lamb/Stewart collection
Water rolled rectangular pebble LHS notch bifacial, RHS initiated from one side only. Both ends of stone worn smooth and notches are ergonomic. Has not been used as a net sinker..

BMB432: 100 x 67 x 17mm, 147g
Dryburgh
Lamb/Stewart collection

Water rolled sub triangular thin pebble. Small notch in LHS (straight) side, irregular notch at apex of triangle. Some very faint hints of abrasion in small notch. Some abrasion to edges. Plough damaged.

BMB433: 95 x 76 x 18mm, 194g
Dryburgh
Lamb/Stewart collection
Water rolled broad oval pebble. Large notch from single blow at top RHS, irregular removal of edge LHS curving around top. No wear.

BMB434: 96 x 65 x 18mm, 188g.
Dryburgh
Lamb/Stewart collection
Water rolled pebble. Sub trapezoid. Clear notch towards flared end on LHS, initiated from one direction, notch on rhs partly broken. Plough damage all over and no sign of abrasion of notches.

BMB435: 76 x 68 x 14mm, 107g
Dryburgh
Lamb/Stewart collection
Water rolled circular thin pebble. Two opposed notches. RHS very shallow, mainly unifacial, lhs also unifacial, initiated from the opposed side. Possible light abrasion to lhs. Top surface very smooth although not clear polished and the piece does not ergonomically work this way up. Edge damage to the base includes some plough damage. Light plough damage over entire pebble.

BMB436: 89 x 46 x 18mm, 118g
Dryburgh
Lamb/Stewart collection
Water rolled kidney-shaped pebble. Naturally concave LHS, small notch added to this, very light alteration of opposing edge. Plough damage. Some possible abrasion of notches.

BMB437: 84 x 58 x 16mm, 123g
Dryburgh
Lamb/Stewart collection
Water rolled sub-oval pebble narrowing to base. Three notches, one large confident bifacial notch to LHS, one large bifacial notch to top of RHS, one small notch to base of RHS. Abrasion to all notches including possible linear cord abrasion on rear of RHS. Light plough damage. Edge damage to both ends, especially base, including removal of small flakes.

BMB438:86 x 42 x 18mm, 98g
'Top East Field 28/2/45 Plough' Dryburgh
Lamb/Stewart collection
Water rolled pebble. Elongated oval. Two opposed deep notches 50mm from end. Notches *c.* 13mm wide. Classic waisted pebble morphology. Possible (doubtful) abrasion to one notch, doubtful abrasion to one end. Plough damage.

BMB439:72 x 39 x 14mm, 58g
Dryburgh
Lamb/Stewart collection

Water rolled thin oval pebble of a fine-grained sedimentary rock (greywacke?). Two opposed central notches, both (irregular) bifacial. Both lightly abraded. Edge damage, in the form of small removals not crushing, at both ends, also plough damage.

BMB440: 53 x 39 x 12mm, 40g
Dryburgh
Lamb/Stewart collection
Water rolled pebble. Oval narrowing to one end 'egg'. Two opposed shallow notches. Semi-regular. Some abrasion on one notch.

BMB463: 156 x 72 x 19, 326g
'Dryburgh 11.8.13'
Corrie Collection
Water rolled elongated oval pebble. Four notches spread evenly along the two long sides of artefact. LHS both bifacial – extensive flakes removed from underside by blow from above, smaller trimming of notches from underside. Notches shallow (24 x 4mm, 32 x 3mm). RHS two notches both bifacial. Also shallow. Possible concave area of abrasion between these two notches. No other clear use damage. Extensive plough damage.

BMB464: 119 x 77 x 19, 292g
'Middle/Main field' – 'MF' Dryburgh
Corrie Collection
Water rolled thin oval pebble. Three notches, two opposed in centre one at top. LHS/RHS bifacial large notches. Top notch less invasive but still large. Abrasion extends over all three notches – *i.e.* not cord abrasion? – extensive edge damage to the base from use as hammer? Three notches make this very ergonomic.

BMB465: 97 x 82(58) x 16mm, 196g
D.R.F. 8.1.21
Dryburgh (?Riverside Field)
Corrie Collection
Very regular sub rectangular swaisted pebble on grey fine-grained water rolled pebble. Two very symmetrical notches, rhs slightly above lhs. Both notches finely formed deep circular types. LHS extensive abrasion in centre, *c.* 18 x 12mm, bifacial blow but quite even (Slightly bigger removal to top?). RHS notch *c.* 20 x 10mm much more invasive: stepped to upper not lower. Similar deep circular notch. Very light plough damage and few edge nicks caused by the plough.

BMB466: 62 x 34 x 14, 48g
Dryburgh
Corrie Collection
Water rolled pebble. Oval. One bifacial notch formed by two blows to top lhs. Slight natural concavity in rhs (only slight). No damage. No clear wear to notch.

BMB467: 54 x 34 x 14mm, 40g
Dryburgh
Corrie Collection
Water rolled chunky sub-oval pebble. Two opposed notches just off centre (25mm from top). Rather abraded but no pattern to this wear. Hints of polishing to bottom. Light plough damage.

BMB468: 26 x 21(18) x 4mm, 3.5g
Dryburgh
Corrie Collection
Tiny very thin sub-oval discoidal water smoothed grey coloured sedimentary pebble. Shale like, and bedding visible in fresh notches at corners. Two notches are slightly offset to the top. LHS: single blow, invasive scar to the upper surface, *c.* 6 x 2mm. RHS circular notch with no clear scar (worn into side through abrasion?). Two areas of notable fresh damage upper right, lower left, both to rear. No plough damage.

Cruick.A: 102 x 79(69) x 26mm, 299g
Dryburgh (?)
Jack & Caroline Cruickshank
Sub-oval pebble of grey greywacke with two notches slightly towards the base. LHS notch (*c.* 24 x 8mm) bifacial scars, Invasive scar to rear with notable termination, much lighter flake to the front. Possible light abrasion the centre. RHS notch less clear. Also bifacial but flake morphology is difficult. Notches in hand-held places. Slight nicks of light edge damage at base and side with light plough damage.

Cruick.B: 107 x 77(55) x 20mm, 230g
Dryburgh (?)
Jack & Caroline Cruickshank
quite fine-grained greywacke. A rather irregular waisted pebble with unusual fractures, very notable edge damage. Two slightly offset notches and a possible third notch to top. LHS flake to front only, very abraded large (*c.* 30 x 12mm) notch. RHS very deep notch, upper part has snapped, notch itself is very circular and heavily abraded. Invasive stepped flake scars to rear.

Cruick.C: 98 x 77 x 22mm, 235g
Dryburgh (?)
Jack & Caroline Cruickshank
fine-grained greywacke, neat sub-oval pebble but waisted pebble is a little unusual due to irregular fracture of the flake on LHS. Two notches vaguely central. LHS notch very steep across a thick section of the pebble. Smaller flake scars to top and bottom do not match the larger fracture. Also smaller impact and flake immediately above notch, prob. from damage. Notable abrasion in centre. RHS more regular notch, Clear flake to the front with and angular removal to the rear. Possible secondary notch immediately above this is prob. caused by damage. Notable cord impression in centre of notch with hints of a line across the face. Plough damage is extensive and deep and edges are extensively damaged also.

Newstd.A: 89 x 64(50) x 15mm, 134g
Newstead
Walter Elliot
Sub-square very fine-grained thin greywacke. Classic type of two notch waisted pebble, RHS notch offset above LHS. LHS large scar with clearer notch in its centre. Scar is very invasive to top with a double step termination. Rear removal is smaller, abrasion in centre. RHS less invasive to front, more so to rear but morphology is good on both. Clear abrasion in centre. Edge-damage small nick at top left rear and bottom left rear. Plough damage is very light.

6.2: Hawick Museum

HAKMG4062: 76 x 60 x 21mm, 125g
'Park, Earlston'
Park, ?Tom Scott collection
Sub-oval pebble of local sandstone with two notches and one 'pseudo-notch' caused by more recent damage. RHS: large notch *c.* 24 x 8mm bifacial and heavily abrade, one face has deep scars. LHS notch: smaller across a chunky section of the pebble. Also very abraded. Light edge damage apart from the secondary 'notch LHS.

HAKMG4063: 87 x 55 x 19mm, 114g
'Park, Earlston, 11/1900'
Park, ?Tom Scott collection
Classic waisted pebble morphology, sub-oval rolled pebble of very fine greywacke, two opposed notches. LHS: most of removal on the reverse, 26mm long scars. Very heavy blow, *c.* 20 x 4-5mm. RHS: massive flake removals *c.* 65 x 30mm but notch itself is very small and with marked abrasion in the centre. Light plough damage but little/no other kinds of damage.

HAKMG4064: 91 x 64 x 19mm, 142g
'Park, Earlston, 1900'
Park, ?Tom Scott collection
Classic waisted pebble morphology, sub-oval rolled pebble of very fine greywacke, two opposed notches, LHS above centre. LHS: irregular notch, 20 x 7mm. Scares on both faces. Very abraded. RHS: larger, more confident notch. Scars also bifacial: *c.* 23 x 8mm. No plough or other damage

HAKMG4065: 111 x 74 x 19, 236g
'Park, Earlston 1900'
Park, ?Tom Scott collection
Large, squarish very flat waisted pebble on a fine-grained greywacke. LHS: odd double notch above centre, Upper notch is confident, large scare on the reverse. Severe erosion the centre (24 x 9mm). Smaller (?) notch below possibly a failed attempt or mis-hit. RHS: smaller notch in chunky side of the pebble 18 x 3mm. Very clear flake removal. Light plough damage and minor edge damage

HAKMG4066: 83 x 45 x 26 112g
'Park, Earlston'
Park, ?Tom Scott collection
Unusual morphology, a smaller, chunkier waisted pebble on triangular type pebble. LHS: simple flaked notch 16 x 4mm with semi invasive scar and some possible abrasion RHS: more complex notch with scars on both sides 20 x 6mm chunky section. No edge or plough damage

HAKMG4067: 96 x 65 x 19mm, 162g
No location information,
?Tom Scott collection
Pseudo-classic type on a red sandstone oval pebble. LHS: simple abraded flake blow with bifacial semi invasive scars 28 x 6mm. RHS: major very invasive step termination flake 40mm wide, depth impossible to ascertain. ?Two blows for this notch, centre is very preferentially abraded. Light plough damage and small impact scars on the rhs.

6.3: Hunterian Museum

A.1936.5: 121 x 71 x 28mm, 303g
Dryburgh/Mertoun
WA Munro collection
Sub-oval partly triangular water rolled sandstone/well sorted greywacke pebble with two large offset notches. LHS notch bifacial at *c.* 54mm from base; *c.* 25mm across and *c.* 7mm deep. Main flake initiated from the reverse, *c.* 48mm wide *c.* 26mm long. RHS notch larger and cruder unifacial removal initiated from the reverse, *c.* 120mm wide but morphology of face affected and therefore difficult to assess depth. Extensive plough damage, also area of damage at top RH corner – probably initiated by the plough. On LHS notch one very small area of possible cord abrasion.

A.1936.6: 122 x 63 x 22mm, 269g
Dryburgh/Mertoun
WA Munro collection
Water rolled sub parallelogram pebble of fine greywacke, rear surface much flatter than the top one. Two offset notches, not morphologically a very good example. LHS notch bifacial crude notch *c.* 42mm from top (offset) *c.* 14 mm wide and 2-3mm deep – on a very square sectioned pebble on this side. RHS bifacial, *c.* 57mm from top (only just offset) 22mm wide, *c.* 4mm deep. Both shallow flakes from an acute angled edge. Extensive plough share damage to top. LHS very smooth, RHS tiny hint of cord wear but very vague.

6.4: Kelvingrove Museum

ARCHNN.1782a: 73 x 51 x 18mm, 86g
'Mann, Dryburgh, JM Corrie 1914'
Ludovic McLellan Mann Collections purchased from JMC
oval water rolled pebble with classic waisted pebble morphology, two opposed notches at centre. LHS notch slightly crude, *c.* 18 x 3mm and flake scar more invasive on rear surface. Slight abrasion throughout notch. But no notable cord scar. RHS notch flake more extensive to rear, almost splits the pebble in two – fault line running throughout material. Light abrasion to centre of notch. (44mm at shortest point) Light plough damage and no edge damage.

ARCHNN.1782b: 104 x 66(52) x 11mm, 113g
'Dryburgh, O.F, 12.3.13'
Ludovic McLellan Mann Collections
OF: Orchard field? Label in a different hand to McLellan's other material
Very thin oval/square water rolled pebble. Notches offset to base. LHS notch very even and neat *c.* 25 x 5mm. No notable abrasion but lightly worn all over. RHS a shallower notch with possible second strike (possible accident) above it. 23 x 3mm lightly abraded all over. Edge damage on rhs (cf. possible 2nd blow) small worn notches and a slight trace of wear at base. Fairly extensive plough damage.

ARCHNN.1783: 120 x 91 x 27, 415g
'JM Corrie, Dryburgh, 28.5.1914, L Mann'
Ludovic McLellan Mann Collections purchased from JMC
'Dryburgh 28.5.14' in a different hand to the names
Large oval/trapeze pebble with classic two notch morphology. 71mm at narrowest point. LHS notch large and more invasive to rear where clear flake fracture is visible. *c.* 30 x 10mm. Not greatly abraded, although this is more notable towards the centre. RHS slightly

cruder ad with more notable abrasion. More invasive to rear than LHS but generally cruder. Slight edge damage to both top and edge and notable plough damage.

ARCHNN.1784: 148 x 81 x 20, 382g
'Mann coll^n, JM Corrie, Bird Net Weight (?) 1914, Dryburgh'
Ludovic McLellan Mann Collections ,purchased from JMC
large waisted pebble on an oval-triangular thin water rolled pebble. Two notches are slightly offset. 63mm at narrowest. LHS notch, very invasive to rear and classic flake scars with notable step terminations. Less notable to front: *c.* 38 x 10mm and worn throughout. RHS smaller notch with notable step fracture to front: *c.* 30 x 6mm. Very worn. Light edge damage to both ends, light plough damage all over.

ARCHNN.1785: 112 x 68 x 12mm, 156g
'Weight ?, Bird-Net, Dryburgh 1914, Mann'
Ludovic McLellan Mann Collections
oval/triangular pebble with two slightly offset notches – fairly classic morphology, 48mm at narrowest. LHS possibly formed by two blows. Has unusual double centre morphology. Flakes not very invasive and notch is consequently very steep: *c.* 37 x 10mm. Notable abrasion in lower centre, less in other but complete flake are worn. RHS large notch. Classic flake morphology to front, notable abrasion in centre, *c.* 35 x 11mm. Light plough damage and very slight edge damage to top.

ARCHNN.1786: 85 x 70 x 19mm, 160g
'Dryburgh, JM Corrie, 1914, Mann coll^n'
Ludovic McLellan Mann Collections purchased from JMC
Unusual morphology but a distinctive waisted pebble nether-the-less. Pebble is rather oddly angled and square based. 51mm at narrowest. LHS notch clear flake morphology on both sides minimal abrasion, *c.* 32 x 10mm. RHS good flake morphology with a more notable step termination. A seemingly deeper notch because of width, *c.* 22 x 9mm. Light abrasion to centre. 1 notch of damage to both top and bottom. Light-moderate plough damage.

6.5: Perth Museum

6AW/1962: 96 x 60 x 24mm, 212g
'Craigsfordmains, Rox, 28/4/03'
James Roberts Collections
Oval grey water rolled pebble (rather thick) with classic waisted pebble morphology although notches are rather abrupt and not invasive. (45mm through middle) LHS notch deep, angular and with notable (?cord) abrasion in centre, 22 x 8mm. RHS shallower, more extensive notch with irregular fracture. Few hints of abrasion, but not as clear. 28 x 6mm. No damage or use wear and no plough damage.

6AX/1962: 86 x 57 x 17mm, 106g
'Blakelaw, Rox, 23/3/23'
James Roberts Collections
Triangular/oval water rolled pebble. Two opposed notches towards apex. LHS notch very shallow w limited extra flake damage (from blow) 20 x 4mm. Very abraded. RHS also shallow, more invasive fracture and less abraded. 21 x 4mm. Extensive damage to top and base, small impact scars, no plough damage.

6.6: Private Collections

RNK.WP.01: 101 x 55 x 17mm, 131g
Rink Farm,
Walter Elliot
Triangular pebble of smooth greywacke, notches offset to base. LHS notch very light, hardly removal at all 24 x 3mm, v little abrasion. RHS larger invasive notch, v little abrasion. Very little edge damage, light plough damage.

RNK.WP.02: 97 x 51 x 16mm, 118g
Rink Farm,
Walter Elliot
Oval pebble very classic morphology with deep notches. LHS notch: large, bfiacial, central. RHS notch: large, bfiacial, central. extensive recent damage to base. Light plough damage

RNK.WP.03: 95 x 64 x 18mm, 178g
Rink Farm,
Walter Elliot
Square/trapeze with two notches. LHS bifacial, extends along edge with some possible edge damage, but shallow throughout. RHS notch: very invasive, possible abrasion. Light edge damage at base. Moderate plough damage

6.7: Selkirk Museum Services

Selkirk.2611: 85 x 71 x 19mm, 172g
No location information
Collector unknown – possibly Elliot/Mason
Sub-oval/triangular pebble. Two notches. LHS shallow, central slightly abraded. RHS large unifacial, very invasive, some abrasion? No significant edge damage, light plough damage

Selkirk.2613: 111 x 76 x 29g, 259g
No location information
Collector unknown – possibly Elliot/Mason
Sub-oval, thick pebble three notches. LHS: single blow, fracture ripples, with cord abrasion. RHS: shallow, invasive, cord abrasion? top notch crude, with rougher edges except in centre with abrasion. Minimal edge or plough damage.

'Selkirk A': 98 x 68 x 16mm, 140g
No location information
Collector unknown – possibly Elliot/Mason
Oval pebble classic morphology, fine-grained pebble with 2 opposed notches above centre. LHS notch: 24x8mm, unifacial, offset above centre. RHS: 24x6mm, unifacial, offset above centre. Possible abrasion RHS notch, edge damage to top. Light plough damage

'Selkirk B': 121 x 76 x 18mm, 278g
'Heights above Tweed, Faldonside, Selkirk'
?Masons writing
Collector unknown – possibly Mason?
Sub-oval, coarse greywacke, 2 notches. LHS: 30 x 8mm ?bifacial light abrasion. RHS 26 x 8 ?bifacial light abrasion. Edge damage above RHS notch. Very light plough damage. Utilised in net at present

'Selkirk C': 98 x 58 x 18mm, 135 g
No location information
Collector unknown – possibly Elliot/Mason
Oval pebble, two notch waisted pebble, notches offset and not aligned. LHS: 25 x 4mm, bifacial, above centre. RHS 18 x 7mm, ?bifacial invasive removal. Small damage flake at tip ?recent. Very light plough damage.

'Selkirk D': 96 x 75 x 18g, 159g
No location information
Collector unknown – possibly Elliot/Mason
sub-oval/triangle pebble with two rather irregular notches. LHS shallow but extensive, heavily abraded, RHS extensive area of notch but morphology complex. Also abraded. Fresh damage above LHS notch. Light plough damage

Non Waisted Pebbles
BMB428: 162 x 60 x 28, 414g
Water rolled pebble. Long elongated. Two crude 'notches' both shallow near base: very ergonomic for Right handed person. Extensive edge damage at top, some at base. Digging implement/adze? See also BMB426

BMB426: 193 x 78 x 27mm, 508g
Water rolled pebble. Long elongated shape flaring out and shallowing to top ('spatulate'). No notches. Base possibly deliberately flaked to oblique angle, possibly broken. Top 'sharpened' with crude flake removals or extensively edge-damaged. Extensive plough damage. See also BMB428.

Appendix 7: Marking Space? stone tool deposition in mesolithic and early neolithic eastern Scotland

This paper, due to be published in K Fewster & M Zvelebil (ed.) forthcoming *Ethnoarchaeology and the Transition to agriculture in Europe* (Oxford: BAR) was completed during this research. It addresses the character of the mesolithic-neolithic 'transition' in the east of Scotland by reference to stone tool deposition.

Introduction

At approximately 4000BC the archaeological record in the east of Scotland changes quite dramatically. Many recent accounts of the transition from mesolithic to neolithic have stressed continuity: although powerful, these approaches do not seem to adequately explain the evidence from this area. This paper presents the preliminary results of my negotiation of this transition, a phenomenon that confused and disorientated me. Like others before, I found myself trapped in an old structural opposition, mesolithic:neolithic, and finding this analytical dualism unsatisfactory I wanted to see if it was possible to reconcile these creations in a different kind of narrative. Partly of course, this opposition is a product of archaeological discourse and language, but it is also a product of the archaeological reality of early prehistory in eastern Scotland. In order to try and avoid these problems this paper sets out examine the ways in which the evidence from a number of spheres of day-to-day life in the past, especially that from stone tool deposition, can contribute to our understandings of these historical processes. This preliminary sketch, based upon ongoing research, is an attempt to find some analytical space to address these issues. For the purposes of this paper 'the east of Scotland' is a loosely defined area extending from the Borders to the Moray Firth. The prehistory of the area is not widely appreciated and I begin by presenting a background to the two periods.

The later mesolithic

The later mesolithic of eastern Scotland is generally defined by a narrow blade dominated lithic technology involving the production of a variety of retouched tools, including a range of 'geometric' microliths. Most of the material consists of surface collections of varying quality or snapshot views provided by rescue excavations: research projects such as the later mesolithic structure excavated in the late 1970's at Nethermills (River Dee) remain unpublished (Kenworthy 1981). Especially problematic is the lack of radiocarbon dates from the east. Although we can now broadly define the later mesolithic as lying between *c.* 8500 BP and *c.* 5100-5000 BP (both uncal.), we have little idea of any internal differentiation within this lengthy period. This rather uneven record is being examined as part of a project funded by Historic Scotland (Finlayson & Warren forthcoming) and this paper is a direct result of one of the initial stages of that research, a predominantly textual review of the stone tool industries of the east.

eastern Scotland is a complex and diverse landscape, strikingly dissimilar to the west coast archipelagos that have often dominated accounts of the Scottish mesolithic. Broad rivers drain a range of uplands, trending eastwards through varied large valleys of fertile land, their extensive estuaries punctuate a coast with a high proportion of sandy beaches. The majority of sites have been found in or near river valleys and the wealth of material recovered from some areas, such as the Tweed Valley, hints that later mesolithic settlement was dense, extensive and complicated. The emphasis on river valleys may be a product of collection bias caused by the presence of agricultural land in these areas. Other important considerations include the loss of the early Holocene coastline in some areas (for example the Tweed estuary) and the fact that the uplands of Scotland are peat covered. But throughout the east a connection between salmon rivers and mesolithic activity seems likely. Sites frequently appear on rocky knolls or relict terraces on south facing slopes above river junctions famous for salmon. Sometimes surface collections from these sites can be very large; over 30000 tools have been collected from Rink Farm, at the junction of the Tweed and the Ettrick for example. Coastal sites are important, especially at estuaries, surface collections are known from the Sands of Forvie (Hawke-Smith 1980) and Bridge of Don and sites have been excavated in Aberdeen (Kenworthy 1982). Lithics have also been found in non-estuarine coastal contexts, especially where protected by dune systems, for example the large collections from Menie Links (Hawke-Smith 1980). Shell middens are also found at coastal sites throughout the east (Coles 1971, Sloan 1993) and these range in size and composition. Away from the valleys, upland sites such as Daer (Ward 1997) and coastal examples such as Fife Ness (Wickham-Jones & Dalland 1998) show that smaller sites, and mobility between different parts of the environment, were also significant. The vegetational history of eastern Scotland is complex, as topography and latitude combine to produce a series of distinct natural vegetation zones, but a variety of mixed woodlands covered much of the area throughout the later mesolithic (Tipping 1994). The evidence for the anthropic manipulation of forest cover by burning during the late mesolithic is minimal; this may reflect a lack of recent research but may also reflect the character of the woodland cover.

The eastern Scottish later mesolithic appears to be characterised by a diverse series of economic strategies. The location of scatters suggests that river valleys were an important part of mesolithic life, especially for salmon. However the coasts were also significant and there are hints of the use of the uplands. It would be inappropriate to systematise these observations, and there seems little reason that mesolithic patterns of landscape use should have remained consistent over a 3500 year period: it seems likely that we are dealing with very flexible lifestyles.

The early neolithic

The early neolithic appears at first to be quite radically different from the mesolithic and there are a number of indications in the archaeological record of fairly significant changes in the ways in which people inhabited the world. Partly, of course, this is a product of archaeological practice. For example, typological analysis developed within a framework that stressed a systematic division of time into bounded entities, encouraging the creation of overly rigid divisions between periods and therefore between stone tool types and the ways in which we date surface scatters. I will examine some of these problems more closely later. At present I am trying to replicate the way in which I initially approached this material, as I believe this might shed light on the ways in which my argument developed.

A range of new evidence becomes available to us at this time, including new artefact types and a variety of monumental architectural features. Pit alignments, such as Douglasmuir (*c.* 4900 BP Kendrick 1995) and Cowie Road (before 5100 BP, Rideout 1997) became significant parts of the landscape, and pits themselves changed character quite dramatically (see below). In terms of funerary contexts wooden mortuary structures, long and round earthen barrows and major earthworks such as the Cleaven Dyke (Barclay & Maxwell 1998) trace their origin to this period. Large timber halls, such as Balbridie (Ralston 1982), also make an appearance in the archaeological record. Alongside monumental structures, further significant changes take place in artefact types. Carinated pottery appears, often deposited in pits, for example at Deers Den (Alexander forthcoming). Another important aspect of the early neolithic is the increase in movement of raw materials; for example it is only in this period that Arran pitchstone begins to appear frequently in the northeast. Leaf-shaped arrowheads and stone axes form a new part of the flint worker's repertoire.

It is important to note that we understand very little of the character of stone tool craft in the early neolithic period in the east, as outside of monumental contexts, few lithic scatters have been excavated. One consequence of this is that we understand little of the settlement patterns of the early neolithic, nor of the economy. Balbridie is dominated by cereal evidence but we should not assume this is true of all early neolithic sites. The elm decline is important in Scotland, but evidence for clearance varies greatly throughout the early neolithic. Local clearances for arable and pasture were certainly significant.

In general then although the details remain fuzzy, especially in terms of economic practice, it seems that over the space of a century or two the ways people were marking their relationship to the landscape changed dramatically. This change seems remarkably rapid given the piecemeal character of the archaeological record for this period and the lack of evidence from the period immediately preceding. This transition, and its apparent speed, baffled me. So much seemed to shift, and I found it very difficult to connect the evidence for the mesolithic with the new patterns that we labelled neolithic. Initially I could not reconcile this evidence with any continuity between the two periods. If I were a product of a different decade I might have seen this as evidence for colonisation into the fertile eastern valleys. But I learnt archaeology through the nineties, and have been trained to be sceptical of such an explanation. Interestingly, by avoiding this answer I made it necessary to find new space in which to think about the evidence from this region: space that I think will ultimately be productive and that suggests that migration is not the correct explanation. But to define this space we must firstly step back from the east, and examine the character of recent accounts of this transitional era.

From mesolithic to neolithic

The character of the mesolithic-neolithic transition in varied regions of the British Isles remains opaque. Incisive local studies have been made, for example in the Western Isles (Armit & Finlayson 1992, 1996), but in general our understandings of this complex historical phenomenon tend to operate at a pseudo-national or international level and processes identified in one area rapidly become paradigms adopted in the interpretation of others. This is unfortunate, as regional variation would have been significant at a number of geographical scales. For example, recent years have seen much stress placed on continuity between the mesolithic and neolithic periods. There is much to welcome in these accounts, which emphasise the internal dynamic and complexity of hunter-gatherer societies, however there are also areas in which they are inadequate. For although a gradual intensification of economic practice may have encouraged the adoption of domesticates, and an increase in sedentism facilitated the use of pottery, there seems little reason to connect these factors to a decision to cut complex pit alignments into the soil as we see in the east. Sometimes it appears that these 'non functional' aspects of neolithic inhabitations are viewed as part of a religious or cosmological package tied up with ancestors and the negotiation of increasing spatio-temporal pressures. There is much to commend here, but we must beware a tendency to wide-scale explanations. Cosmologies vary widely, developing and transforming through time and space (Barth 1987) and our accounts require a greater sensitivity to these processes.

If we wish to understand local manifestations of wider scale phenomena we require analyses that allow us to examine not just the new evidence which marks the 'neolithic', but also the transformations in old. We need to shift our focus away from the monuments and look at the forms of practice that sustained the ritual moments that sporadically took place at these sites. There are problems of resolution here, and it seems clear that in a situation where we understand so little of the routines of people's lives any attempt to reconstruct day-to-day life must be cautious. However there are fields of evidence that allow us to think through these questions. One of these is stone craft, which provides a clear link between human activities that involved pottery and cereals and those that did not.

Stone Craft and Deposition

Most stone tool analysis has been concerned with technological rather than sociological factors. As a consequence, the potentials of stone tool analysis for understanding human agency in the past remain under-fulfilled. For the purposes of this preliminary study I will be focusing on what the patterns of stone tool deposition or discard can tell us about human decisions in the past. To study deposition in isolation is evidently undesirable, and ongoing research will fill out this sketch.

Stone tools are caught up in a variety of tasks undertaken by individuals and through these interactions they become entangled in various webs of meaning. One aspect of these tasks includes the discard or deposition of stone tools or debris. This may be due to highly conscious structured decisions, casual losses, or anywhere between these extremes. In order to think our way through this complex range it may be helpful to distinguish between two ways in which stone tools may have meaning worked around them. Stone tools can hold either *tacit* or more *explicit* associations (Edmonds 1995, 1998). We will explore the possibilities of these frames in more detail, but it is important to note that tacit and explicit meanings are connected, in a similar fashion to the ways that daily life and ritual are connected. It is through the former that potentials for the latter are generated, the latter then feed into and inform the former. The complex processes of ritual behaviour lift elements of the mundane into the numinous, serving to reiterate and reaffirm or break down and challenge complex series of associations.

Tacit meanings refer to low key sets of associations, probably intimately tied up with daily life, particularly with the compulsion of subsistence: the ways that tools and forms of stone-craft may be associated with tasks. For example bipolar knapping has often been linked to the preparation of fish, for which a supply of un-retouched flakes is adequate. Individuals would have understood such associations in the past, and these may have carried further resonance. Perhaps children might have carried out the preparation of fish more frequently than adults. Bipolar knapping could then have been associated with children's activities. The details remain obscure, but these quiet repeated associations were an important aspect of socialisation.

In contrast to these sets of meanings are the times and places when more explicit symbolic statements appear to be made with stone tools: when stone tools were used to say something about how people related to the world, for example when deliberate deposits are made with burials. In these episodes the associations that tools and stone craft carry were highlighted (Edmonds 1998). These moments are best understood as associated with ritual events, which are a context in which the social order is under some stress, when the dominant ideology is open to a certain level of questioning (Barrett 1994). These were times and places when human agents may have exploited the communicative potential of stone craft: when the deployment of stone tools might serve to reiterate, or to challenge, common understandings.

Tacit meanings may be difficult to spot archaeologically, as they are inherently understated. Explicit meanings may be easier to spot, or, at the very least, we may be able to identify some of the times and places in which ritualisation crystallised the symbolism of stone. Perhaps at these moments we can come closer to understanding the principles that helped to generate human decisions in the past. Because ritual and the mundane are so closely linked it may then be possible to also say something about the character of everyday life and look more closely at the transition in the east.

Stone tool deposition in the mesolithic

The majority of later mesolithic sites are defined by the presence of chipped stone. This creates an immediate circularity to any argument about the deposition of lithics, as it is essential to ask what aspects of mesolithic life we are missing by virtue of this archaeological perception. However by focusing on discard it is possible to highlight certain patterns in the data, albeit at a rather coarse level, that seem to have some coherence. (In order to do so it is also necessary to consider sites outside of eastern Scotland.)

The general impression is of fairly casual discard. Lithics seem to be mundanely deposited as a by-product of a variety of human actions. In many instances lithics have been associated with light framework structures, pits and scoops, or hearths [at Morton (Coles 1971), Nethermills (Kenworthy 1981), Fife Ness (Wickham-Jones & Dalland 1998), Aberdeen (Kenworthy 1982), and Tweed Valley sites (Warren 1998)]. Whilst there is some question about the extent of middening, it is clear that stone tools and debris were incorporated into settlement floors because there are some hints of ordering of depositional activity. The interim report from Nethermills records spatial patterning in the lithics data (Kenworthy 1981) and broad scale differentiation between areas of a site is apparent in the material from Manor Bridge in the Tweed Valley (analyses by the author). Similar observations have been made at Kinloch, Rum (Wickham-Jones 1990) and Mt Sandel, Northern Ireland (Murphy 1996). At Low Clone, Dumfries and Galloway (Cormack & Coles 1968), spatial variation was also highlighted. Interestingly, the excavator argued for seasonal occupation at this site and this implies that the principles underpinning depositional activities were repeatedly enacted: long-lived, and not the product of chance.

The explicit symbolic deposition of stone tool craft appears rare in the Scottish mesolithic. In northern Europe stone tools were placed with burials, whilst flint pebbles, worked in curious fashions, may have been associated with votive deposits into bogs (Mithen 1994: 123, Tilley 1996: 68). These are clear hints of a concern with the symbolic properties of stone and tasks that incorporated stone tools. However neither practice has been recognised in Britain. This may be a product of post-depositional factors; in Scotland's acidic soils burials would not survive, but there is no pressing reason that Scotland's mesolithic should follow southern Scandinavian practices and at present we should simply recognise that there are no burials. The numerous deposits in bogs are interesting but at present there is no evidence in Scotland pertinent to this question.

We might suggest the following frames for stone tool deposition in the Scottish later mesolithic. The hints of pattern in the deposition of stone tools are not strong but we might associate these with repeated, mundane activities and the principles that generated them with tacit meanings, the associations and resonances drawn from daily life; where rubbish is placed, how it was associated with various activities, and perhaps various people[1]. Evidence for more explicit symbolic use of stone is lacking but this may be a product of archaeological preservation and *recognition*. We'll return to look at the invisibility of 'ritual' during the mesolithic later in the argument.

Stone tool deposition in the early neolithic

As well as many new types of evidence the early neolithic also sees changes in the ways in which stone tools are deposited. Two general areas of divergence might be examined, the creation of seemingly new contexts for deposition, especially monuments, and the rarity of flint scatters.

Stone tools are found in many funerary contexts in the east and seem to have been incorporated into these structures in a variety of fashions. Two spheres of practice are seen at funerary sites, the deliberate deposition of individual artefacts and the possible incorporation of midden material into funerary ritual. Midtown of Pitglassie highlights both tendencies

(Shepherd 1996). Here an un-burnt, broken leaf-shaped arrowhead was placed in a cremation pit, dated to 4935±105 BP (GU-2104) and pottery and lithics were added to the area after the bodies were burnt: the latter are argued to represent 'ad-hoc incorporation of knapping debris from the locality' (1996:35). In the northeast section a 'grey-black sticky soil' was identified on the subsoil, containing fine sherds of early neolithic pottery. This deposit is sealed by the construction of the ring bank and is dated to 4660±50 BP (GU-2049). Shepherd (1996:23) suggests the material is a deliberate deposit, an organic rich deposit like this may well have been midden material. At Boghead, Speymouth Forest (Burl 1984), a number of lithics, sherds of pottery and cremations were also sealed underneath a mound. A dark layer, containing 23 flints, 7 of which were burnt, separated the cairn from the sandy subsoil. This might also be interpreted as a midden deposit and is dated to 4959±110 BP (SRR-689) and 4898±60 BP (SRR-686). Alternative explanations of the dark organic deposits in these contexts are possible, they may, for example, represent occupation floors, however, burial traditions in better known areas such as Caithness, include the incorporation of midden material into funerary rites (Henshall 1963). These possible links between middens and tombs are very interesting given the associations that often exist between middens and fertility. Even if not all of these deposits are middens, and some are occupation floors, it might be argued that this still reflects similar concerns with rubbish and ways of marking your relationships with place. As well as middens, leaf-shaped arrowheads appear to have been particularly significant, and not all of these seem likely to have been incorporated into the tomb within human vertebrae, as at Camster Long (contra Davidson & Henshall 1991: 66) (see below for other examples of deliberate deposits with arrowheads). Although the details are obscure close rules may have operated at funerary sites delineating forms of deposition of stone tools. These moments were opportunities for stone tools to be exploited as symbolic media.

If we turn to other types of neolithic monumental structures in the east a number of further comments about stone tool deposition can be made. Balbridie produced only 131 chipped stone artefacts, and mainly in association with destruction deposits (*c.* 4740 BP) (Ralston 1982) whilst only a 'handful of lithics' were found in association with the analogous structure recently excavated at Kinbeachie on the Black Isle (Dalland pers. com). The timber structure at Douglasmuir produced no lithics (Kendrick 1995). These sites are all plough zone sites, and poor artefact recovery is to be expected but this does not explain all of the distinctions as some truncated sites do contain artefacts, especially deposited in pits.

Pit alignments with deposits of neolithic material are common in eastern Scotland, at Deer's Den for example, recent excavations revealed a truncated series of early neolithic pits containing chipped stone, pottery (carinated and uncarinated), hazel nuts and cereals (emmer wheat and barley) (Alexander forthcoming). One pit (1028) contained a deliberate deposit: 168 potsherds and 61 chipped stone pieces, including a leaf shaped arrowhead and a flake of Arran pitchstone. Two carbon dates, of 4945±40 BP (OxA-8132) and 4895±40 BP (OxA-8133) were obtained from this pit. Although the pits were of varied shapes and depths they formed a sub-rectangular feature, approximately 12m x 17m. Many of the pot sherds and 45% of the flint assemblage was burnt and both types of material looked fresh, suggesting rapid incorporation into the pits rather than casual and long term silting. The excavator suggests that the regular arrangement of the pits may be associated with a structure, now lost. Interestingly the analysis of the chipped stone tools from the site suggests that scrapers were being *deliberately* put out of use by bipolar flaking (Alexander forthcoming). Here again we see hints of highly structured practices involving the deposition of stone tools, especially leaf-shaped arrowheads.

We will return to discuss the significance of pit deposits but we must also consider their impact upon the archaeological visibility of the period. Healey (1987) has argued that early neolithic flint scatters are under-represented in surface collections from the south of England because they were originally deposited in pits, and thus protected from the plough. It may be that similar problems are apparent in Scotland, as one of the most striking differences between the archaeological signatures of the later mesolithic and the early neolithic concerns the visibility of surface scatters. In the three areas where most extensive field walking has been undertaken, the Tweed (Mulholland 1970), the Dee (Kenney 1993) and the area near Clava (Bradley pers com) early neolithic sites are rare. Whilst it may be true that the lack of domestic early neolithic structures in the east is partly caused by their location in valley bottoms or low terraces this seems unlikely to explain their almost complete absence from the surface record. The valley bottoms of some areas, especially the Tweed and Dee, have been repeatedly searched and in these areas late mesolithic and later neolithic or early bronze age material is relatively common. To argue that *all* of the early neolithic sites are hidden under very specific environmental niches in these valley bottoms appears to be special pleading. Perhaps the deposition of material in pits, for which there is a wide range of evidence in the early neolithic, is a significant factor here. If so this represents a major change in stone tool deposition from the seemingly casual patterns of the mesolithic.

Of course, as stated above, we remain unsure of the character of early neolithic stone crafting, and this has greatly exacerbated these problems. It is however relevant that one of the reasons for this gap in our knowledge may itself *be* the scarcity of early neolithic flint sites outside of stray finds of axes and arrowheads. Even where scatters of flint are found, they are rather strange in character. At Lunan Head, 27 arguably early neolithic artefacts were discovered in a low scoop (Wickham-Jones & MacKenzie 1996). Of these, 19 came from 4 specific nodules of high quality grey flint, a type unknown in Scotland. There was no knapping debris associated with a deposit that is again suggestive of deliberate, structured activity.

In the early neolithic then, much seems to have changed. Stone tools are incorporated into new contexts, in complex manners that must have highlighted the meanings and resonances carried by those objects. Alongside this, evidence for the mundane deposits of stone tools seemingly apparent in the mesolithic is lacking in the early neolithic. This pattern is probably exacerbated by our problems with early neolithic flint working, but seems unlikely to explain all these differences. However before we can move on to discuss this matter further we must first establish how valid this crude distinction is.

Problems

There are a number of potential problems with such a distinction between the patterns of deposition outlined above. With so little information about site function it is hard to compare between 'mesolithic' and 'neolithic' sites in terms of the quantities of stone tools which they produced, crop processing, for example, requires fewer chipped stone tools than preparing meat carcasses (I am grateful to Mike Church for this point). The early neolithic is also a shorter period (c700-1000 C14 yrs) than the later mesolithic (c3500 C14 yrs), and consequently we might expect to see fewer surface scatters[2]. These points are important, but address the *quantity* of stone tools we might expect to find, and seem to have little implications for the *qualitative* differences in deposition highlighted above.

I became especially concerned that I was reiterating the binary division between the mesolithic and neolithic by this kind of account. Although nominally comparing stone tool deposition it rapidly became clear that I was not comparing like with like. In the mesolithic I was looking at settlement evidence and surface scatters, in the neolithic funerary contexts and 'ritual' behaviour. This is partly due to the ways we tend to approach these periods, but interestingly was also due to the character of the evidence available. More concerning still was the possibility that the contexts in which neolithic flints was preserved, beneath a mound for example, created a differential level of survival allowing me to discuss more subtle patterns of depositional behaviour. Such analyses seemed to run the risk of reiterating the mesolithic as a period dominated by subsistence, and the neolithic as the glorious discovery of symbolic meaning.

Other classes of evidence were nagging at my mind. Shell middens, for example, raise a series of questions that seem directly concerned with rubbish, fertility and stone tool deposition. Often classed as 'mesolithic', formal chipped stone tools are rare at these sites, and in fact many of these sites are used into the 'neolithic' in strictly chronological terms (see below). By trying to compare 'mesolithic' and 'neolithic' behaviour I risked creating a false divide. How was I to reconcile this?

One way of making sense of this data appeared to be to inject a little history into my account and to ask *how it became possible* for these new forms of behaviour (pits, new depositional practices, building monuments) to develop. A number of tendencies in the later mesolithic can be highlighted which might be pertinent to this issue: middens, intensification, and pits.

Traces

Middens are found throughout eastern Scotland, and the best known example is Morton B (Coles 1971). The middens incorporate large amounts of shell, which at times is clearly the dump of one meal, as well as varied bones. Structural evidence, hearths and light shelters, are also found, stone tools are rare but bone tools are present.

Often middens have been treated by archaeologists as a pool of environmental data, as a guide to what people ate and when they killed it (for example Mellars 1987; Pollard 1996 is an important exception). Despite the wealth of information that has been recovered from these analyses this stress is somewhat unfortunate, because by focusing on the content of a midden, we have forgotten to ask how it was constructed. The question appears mundane, yet many middens were the products of long standing repetitive activities – dumping the remains of a shellfish meal. In some sites, these repeated activities lasted for over 2000 years. We cannot be sure about the changing context of these activities (for example, did the same kind of individual always carry out the processing?) but we can identify a rather surprising stability in people's attitudes to rubbish: they consistently chose one place rather than another in which to dump their food.

Middens could be monumental in their own right: shells gleaming, and crunching underfoot, or low grass mounds to the rear of the beach. Some of these were dominant locales that repeatedly drew people towards them, places that *expressed* a history of repeated acts that individuals could relate to. Here was history, embodied in a mound of shellfish. Middens were one of the few constructions of the mesolithic that provided a context in which people could see congealed human agency operating in the landscape beyond the time span of the generation. They may also have contributed to a sense of ontological security - to the durability and correctness of decisions regarding the deposition of rubbish.

It has frequently been argued that the later mesolithic saw a steady intensification of economic activity, possibly connected with population growth. This intensification may have involved increased management of woodland resources, increased investment in delayed return subsistence technology (static fish traps for example) and increasing sedentism. There is no unambiguous evidence in eastern Scotland for this intensification of activity (although some of the larger scatters in the Tweed valley might be hints of greater residential stability) and much more detail is required from this area. However given the generally widespread character of this phenomenon, and the fact that that there is not any evidence that it *did not* happen in eastern Scotland perhaps we can at present assume that these processes were underway. Such an assumption allows us to further develop our model.

If intensification was the case then later mesolithic individuals may have moved through a landscape increasingly marked by human agency, of managed resources for example. Increased sedentism and population numbers may have contributed to changes in the visibility of settlement, bare earth paths worn away, marking the routes of labour near home for example. As with middens the extent to which human agency affected the landscape was becoming more visible. In this context I find it fascinating that many of the innovations associated with the early neolithic are to do with 'altering the earth' (Bradley 1993). Many of the crystallised human decisions we examine appear to be concerned with manifesting the relationships between people, time and the landscape in particular ways.

Pit digging might be instructive. We have seen that pits were highly formalised during the early neolithic. They may also have played an important role in storage during the later mesolithic, and possibly therefore formed an increasingly significant part of mesolithic life. At Spurryhillock, near Stonehaven for example, a truncated large pit (2.3mx1.8m and surviving to 1.35m in depth), with oak charcoal at its base was dated to *c.* 5750 BP (Beta-73552 5860±70 BP, Beta-73553 5700±70 BP) (Alexander 1997). A small (9 piece) blade dominated collection was associated with this feature which had filled over some time.

At Cowie Rd, near Stirling a u-shaped pit enclosure was recently excavated (Rideout 1997). During Phase 1 roughly circular pits, with steep, often vertical sides and a flat bottom had been dug into a gravel terrace. These pits contained very few artefacts and showed little sign of burning. There is nothing to suggest that these pits were deliberately backfilled and they appear to have silted up naturally. Many of these pits were later reopened, the original fills removed and off-centre stone linings inserted into steep circular pits (Phase 2). Extensive burning evidence suggests that plank linings were burnt in some pits. Finds included carinated pottery and a range of lithics that Ann Clarke describes as having mesolithic affinities (ibid. 49). In particular it is argued that the blades may have been deliberately deposited, these items include pitchstone. Dates from Phase 2 activity at Cowie Rd vary. Pit P6 returning 3 dates from oak of *c.* 5135 BP (average figure of AA-20409, AA-20410, AA-20411) and P25 returning a single AMS date of 4830±60 BP (AA-20412). Phase 2 was not one synchronous act and may be best understood as the result of repeated patterns of activity over some time. In each episode a pit was opened and refilled.

Although the chronology refuses resolution, here again we see clear suggestions of the importance of pit digging and deposition during this transitional period and with hints that this has clear 'mesolithic' affinities. The Phase 1 pits certainly must predate 5100 BP. It seems that we have a sphere here in which 'neolithic' practices draw upon and transform existing patterns of behaviour: why might this be?

Intensification may also have been associated with increased internal social tension as increased population or residential stability contributed to social instability, perhaps to challenges to accepted forms of behaviour or conceptions of how the world worked (I am indebted to Bill Finlayson for this idea). And perhaps as the influence of people in the landscape became more visible this tended to focus questions and challenges to accepted forms of behaviour. One way of coming to terms with this tension, and maintaining power relationships between individuals, may have been to increasingly regulate and define activity surrounding deposition and ritual.

A distinction has sometimes been drawn between 'prescriptive' and 'performative' societies. This scheme describes forms of ritual behaviour, acknowledging that some societies have certain regularities in the forms and types of their practices, which tends to produce stability over time whilst other societies are relatively free in this context and forms of practice mutate rapidly. It has been suggested that neolithic societies tended to be prescriptive in type and this appears to be evidenced by the longevity of some ritual practices (Bradley 1998). It should be acknowledged that prescription and performance sustain each other, and that the manipulation of expected forms of behaviour during a performance is a powerful act. Interestingly variations within and between regions hint that performative aspects of neolithic ritual were important, however the broad distinction is still of some use as a shorthand.

It may be significant that having a stable form of ritual over time, as a 'prescriptive' society, would greatly increase the chances of archaeologists recognising that behaviour. Archaeology involves the recognition of patterns, and stable forms of practice generate these patterns. By contrast a performative society may leave little trace we can recognise. Perhaps then, we might ask if the mesolithic was more performative in its rituals, and consequently appears to have few of them. This may help to explain the invisibility of 'ritual' stone tool deposition in the Scottish mesolithic. Possibly the instability of these practices over time has left us little pattern to recognise, individual sites remaining enigmatic. In contrast the neolithic was more prescriptive in its ritual practices, rules were more closely defined, and spread over larger distances.

This perhaps affords us the space required to think about this period and to examine the ways in which the new material items and practices associated with the neolithic package were embedded in people's lives. During the later parts of the mesolithic, in a steadily intensifying society people faced two important medium term historical phenomena. One of these was the increasing visibility of human agency in the landscape and the other may have been an increase in social tension connected to population growth. For years forms of practice shifted and changed, and a concern with rubbish and agency may be marked out in the evidence from middens and enigmatic pits in the period *c.* 6000-5000 BP.

Into this context arose the opportunity for the manipulation of new items, and a partly new vocabulary of ways of altering the earth. As these items and practices became available to people new potentials for being human also became available, new ways of inhabiting the world. This threw into sharper relief the concerns with social regulation highlighted above. This heightened process fed into the increasing concern with rubbish and human agency and the two were embodied in a congealment of formalised practices delineating ways of altering the earth. Part of this involved changes in the ways in which stone tools were deposited but these concerns ran much wider, spiralling through the many facets of life in the east of Scotland. The adoption of new forms of material culture in the centuries following *c.* 5100 BP did not take place in a vacuum, but involved the creative manipulation of new media by indigenous people undertaking the day-to-day task of making sense of the world that surrounded them.

Review

I am somewhat uneasy with this paper. In part this is a product of our rather coarse understandings of the east, especially this transitional period. As a consequence my geographies are vague and at times I feel that I impose a scheme onto the data. But my largest concerns are focused upon the problem of language: its' tendency to familiarise, and dichotomise. Archaeology still remains exceptionally traditional in its use of language and this paper is no exception to that. I did consider different ways of writing, but in order to condense and present this range of information I decided that a traditional approach was best.

I'm not so sure now. Theory sits too starkly opposed to evidence, mesolithic to neolithic, ritual to the everyday, explicit to tacit, prescriptive to performative. Although I perceive complex relationships I write in binaries: and whilst these distinctions can provide space to help conceptualise the problems of this transition period they also run the risk of polarising and caricaturing. For example I am acutely aware that my use of the concept of 'ritual' in this study is weak, but in the context of a short and fairly preliminary paper I feel it can still be justified as of analytical use. Others, of course, will disagree.

Further research, and better evidence will help with these difficulties, hopefully affording the microscale detail to work with and show how these schemes operated at a number of different levels. But evidence *alone* is not going to resolve all of our difficulties with this period, ideas will also be vital (Barrett 1994: 88). One thing seems clear: our constructs 'mesolithic' and 'neolithic' both help and hinder us. By creating a false opposition they can highlight some significant patterns, but it is only by ignoring our labels that we will be able to explain these historical phenomena. As Abbas notes:

> 'Binarisms are too stable – they tend to smooth over differences and contradictions and end up being no more than a copulation of clichés.' (Abbas 1996: 215)

Acknowledgements
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Notes
1 It should be highlighted that for some stone tools the associations with tasks may have been mediated by the composite tool of which they formed a part. For microliths the haft of a leister, or backing of a knife may have held more meaning than the stone itself, scrapers may have been embedded in wooden handles.
2 The influence of varying population density over time on this is unquantifiable.

ILLUSTRATIONS

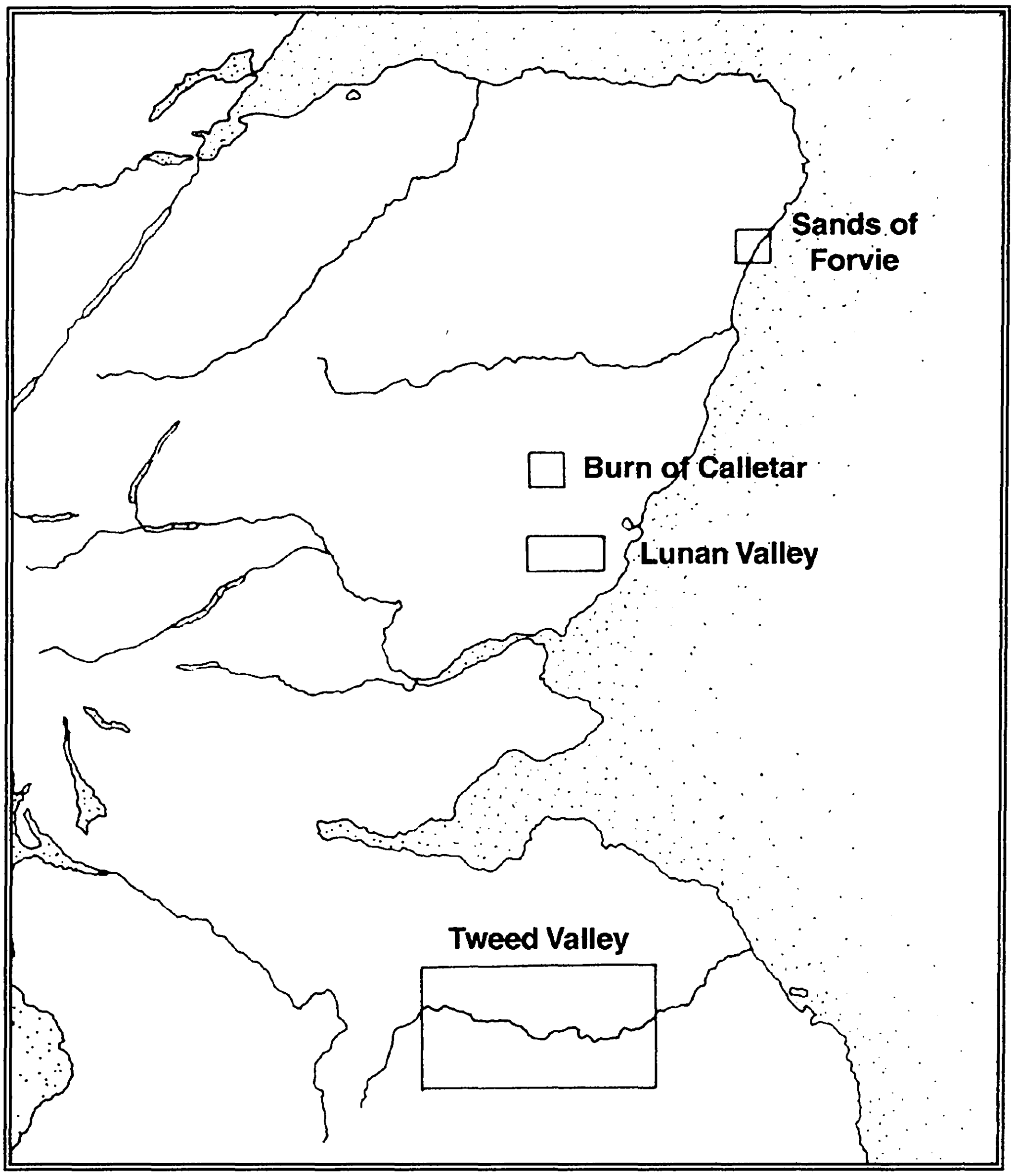
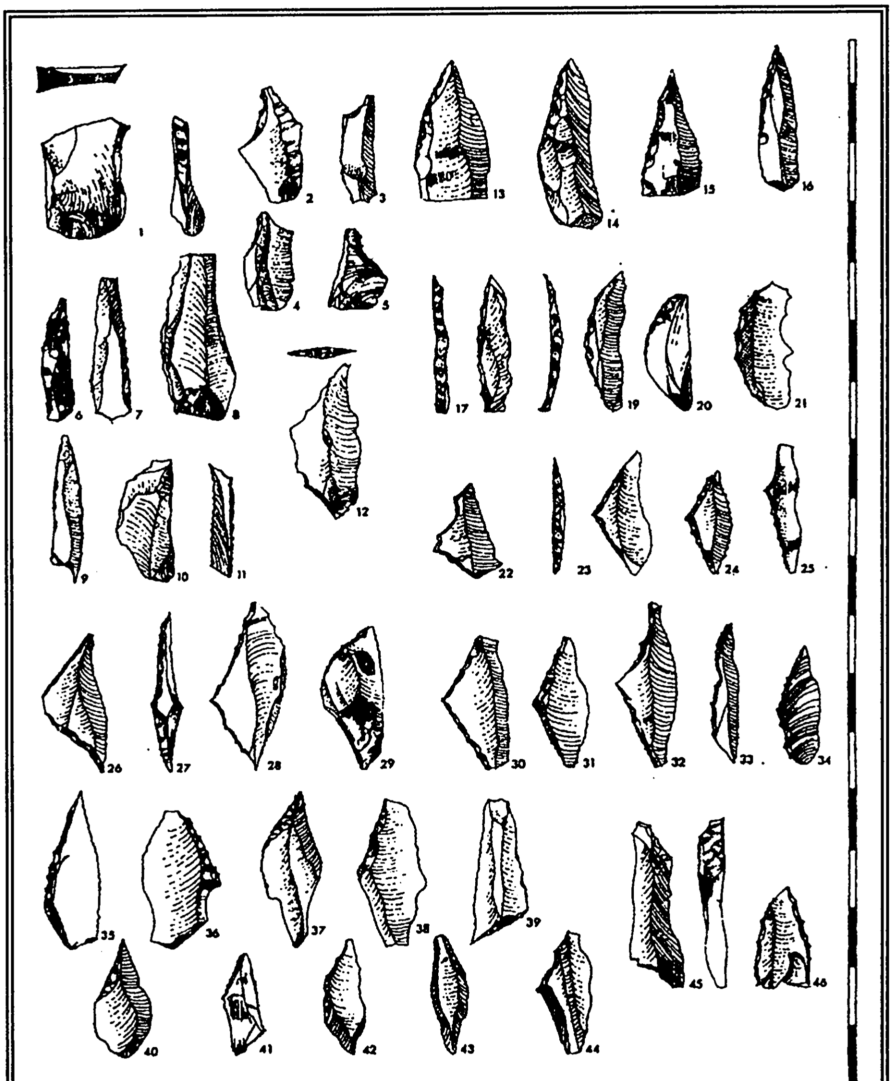


Figure 1: Location of case study areas

	Surface					Excavation				
	%	N				%	N			
Flint	13.6	37				12.5	69			
Chert	85	232				86.3	478			
Other	1.4	4				1.2	7			
		273[1]					554			
	Min	Max	Avg.	St Dev.	IQR	Min	Max	Avg.	St Dev.	IQR
Length	6	51	18	7.3	13-21.25	3	58	16.3	8	11-20
Width	3	38	13.3	5.8	9 – 16	2	55	12.4	7.1	8-15
Thickness	1	22	5.8	4	3-7	1	45	5.6	5.2	2-6
	%	N				%	N			
Flake (Reg.)	28	85				23.4	139			
Flake (Irreg.)	20.4	62				32.4	192			
Blade	15.1	46				7.9	47			
Core	7.2	22				6.7	40			
Chunk	28.6	87				26.8	159			
Bipolar core	0.3	1				0	0			
Bashed Lump	0	0				2.5	15			
Unk.	0.3	1				0.3	1			
Not retouched	86.2	262				91.1	540			
Retouched	11.8	36				7.1	42			
Possibly retouched	2	6				1.8	11			
		304					593			

Figure 2: Characteristics of artefacts from surface and excavated contexts from Manor Bridge

[1] 31 chips of flint/chert from surface, and 39 from excavation, not individually identified



(Coles 1971, Fig 11, Scale in cm)

Figure 3: Artefacts from Morton A including characteristically 'early' mesolithic types (Coles 1971)

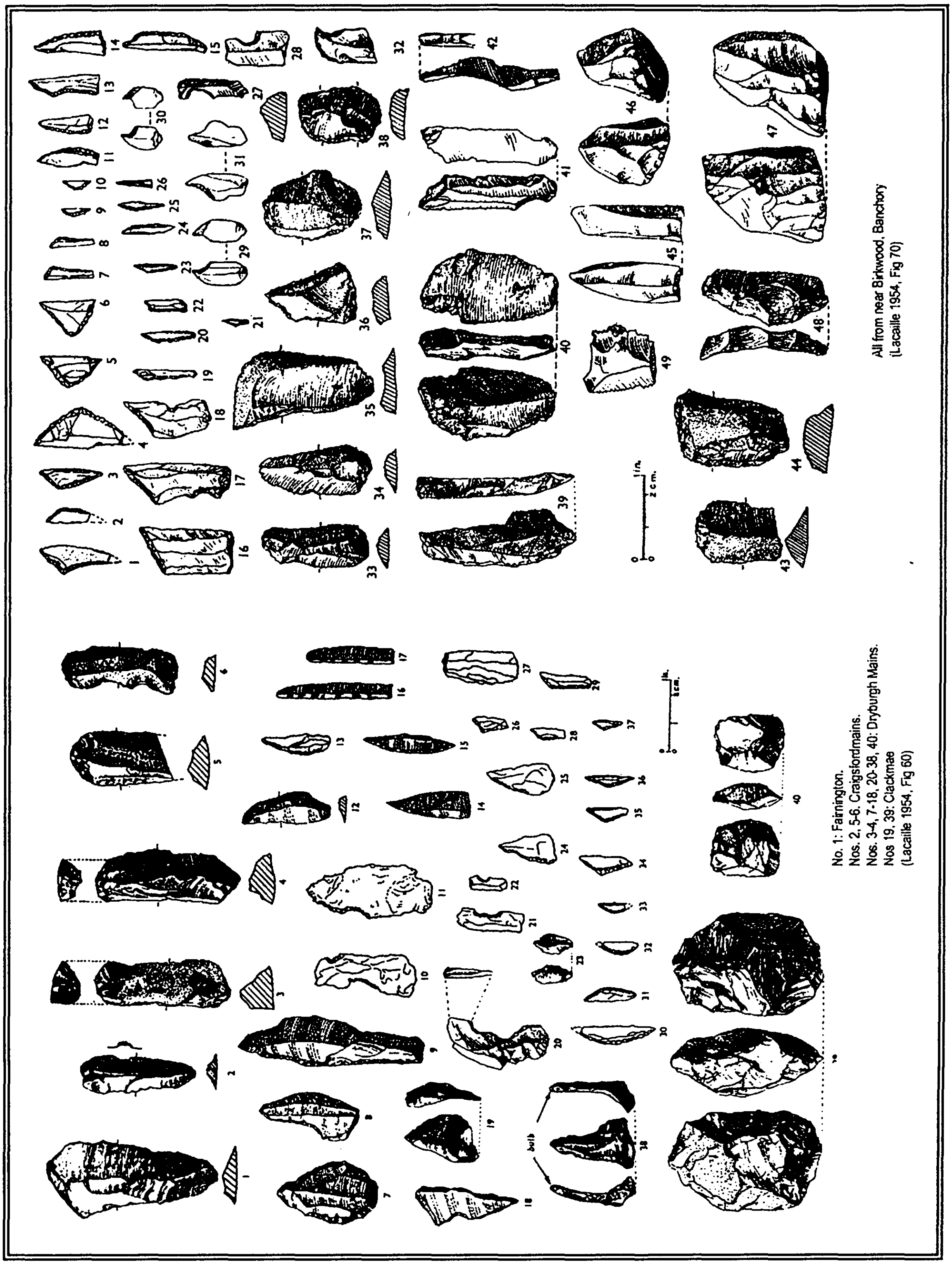
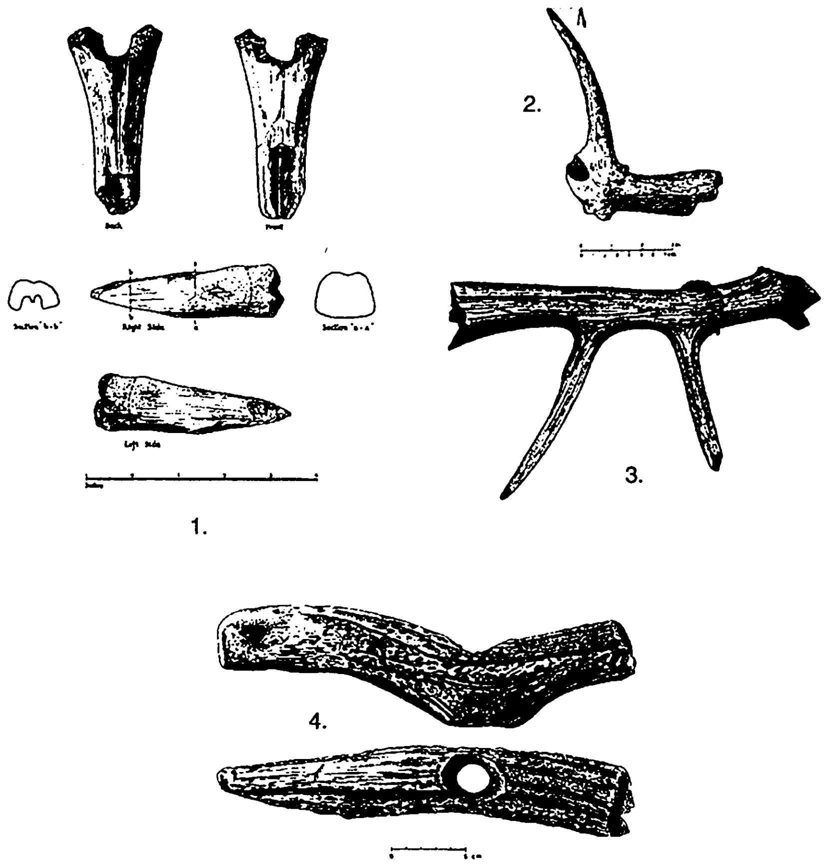


Figure 4: mesolithic artefacts from Dee and Tweed (Lacaille 1954)



1. Bone tool, supposedly from Grangemouth (Lacaille 1954, Fig 66)
2. Bone tool, 'borer', Causewayhead (after Lacaille 1954, Fig 65)
3. Bone tool, Stirling Bridge (after Lacaille 1954, Fig 66)
4. Antler-beam mattock 'Type C', Meiklewood, Stirling (Smith & Bonsall 1990, Fig 2)

Figure 5: Bone tools from Eastern Scottish contexts

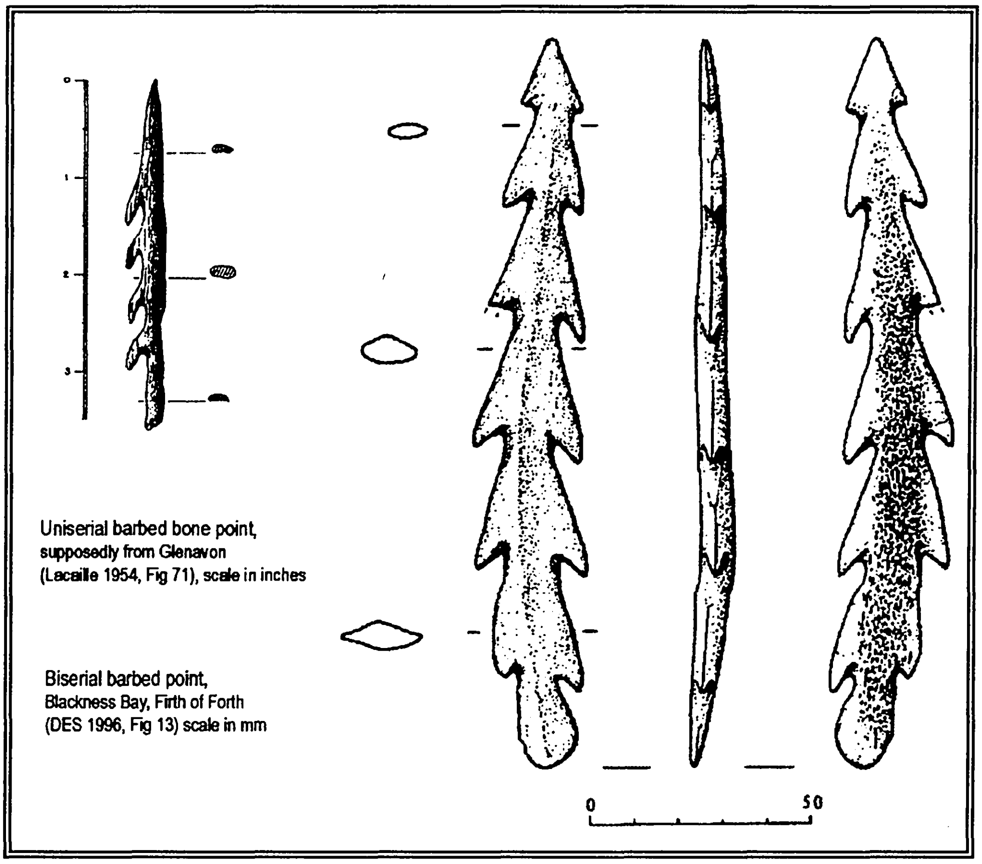
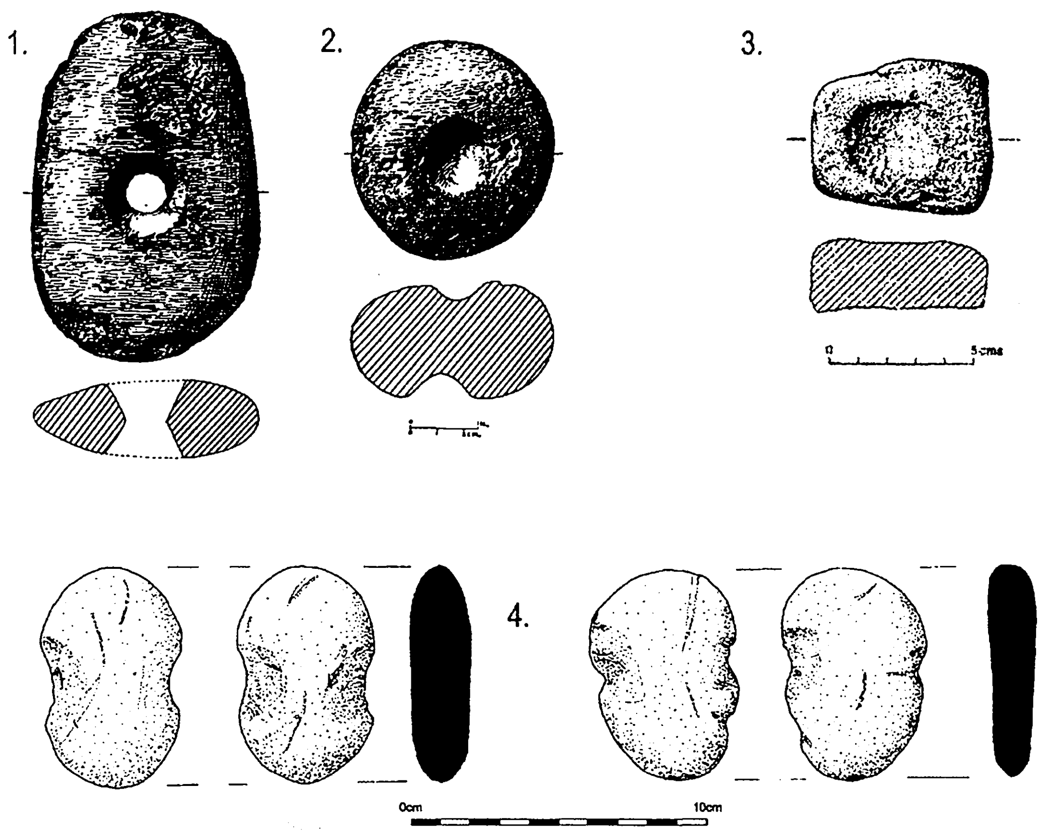


Figure 6: Barbed bone points from Eastern Scotland



1. Perforated 'hour glass' pebble from Tweedside (Lacaille 1954, Fig 61)
2. Countersunk pebble from Tweedside (Lacaille 1954, Fig 61)
3. Hollowed pebble from Fifeness (Wickham-Jones & Dalland 1998, Fig 9, Cat. no. 434)
4. Waisted 'net sinker' pebbles from Dryburgh Mains
(NMAS: BMB 21 [left] and 437 [right])

Figure 7: Coarse Stone Tools from Eastern Scotland

(Sollas 1915, Fig 215)

Figure 8: Digging stick weight

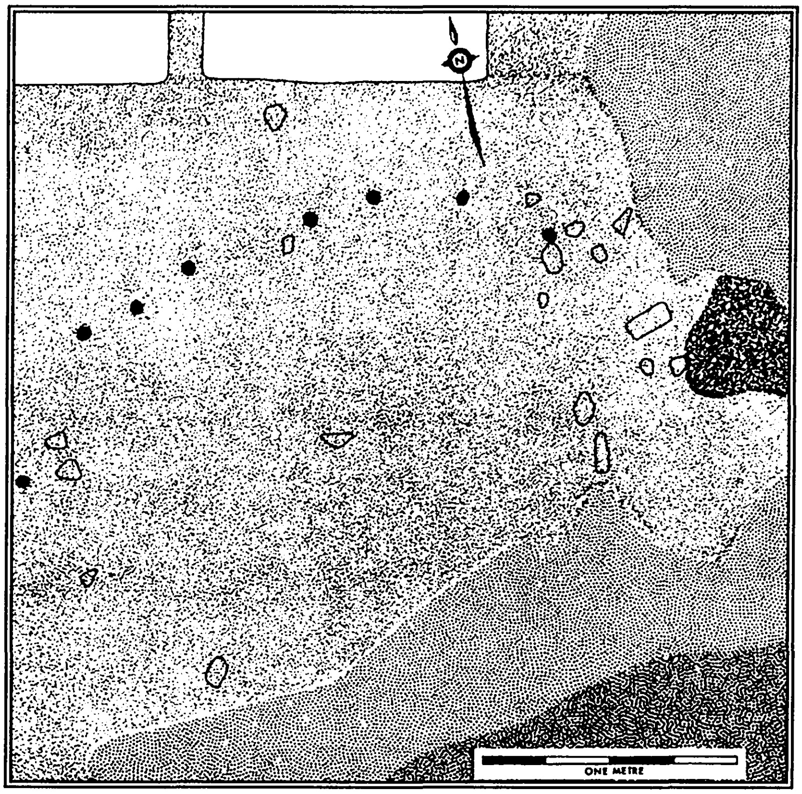


Figure 9: Ground-plan Morton T43 (Coles 1971: Figure 21)

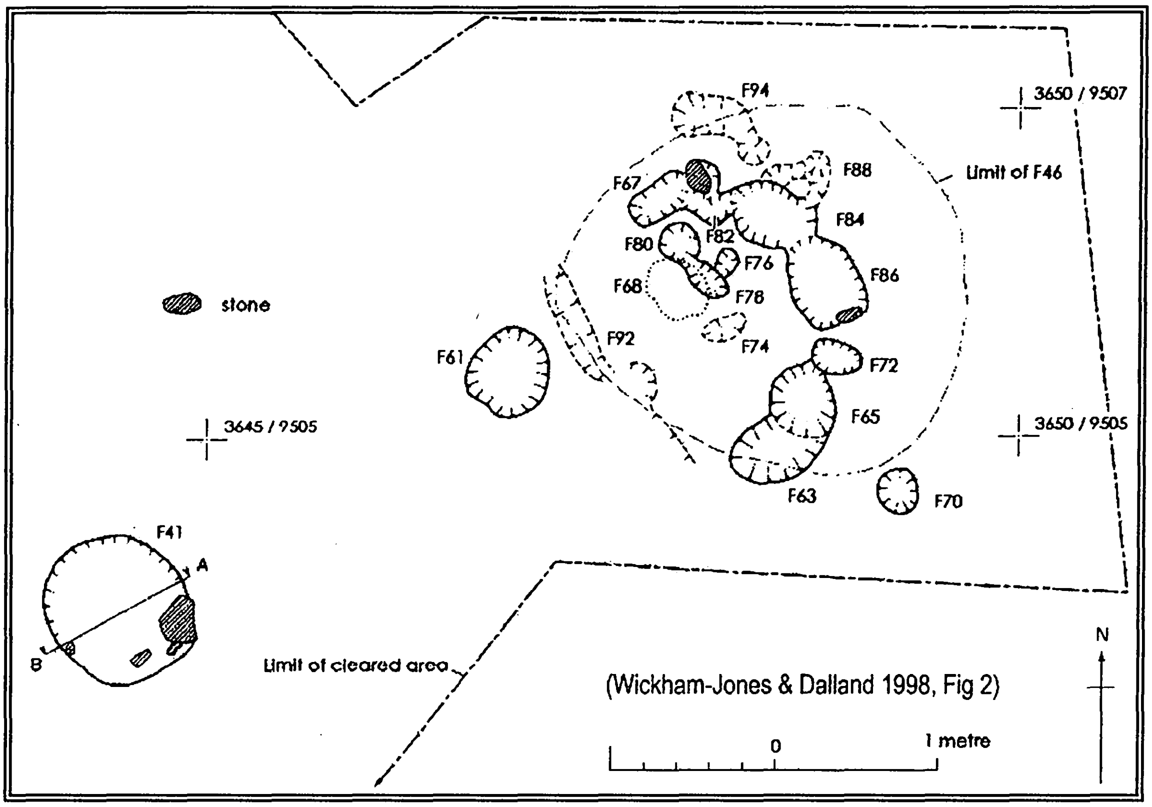


Figure 10: Fife Ness ground plan (Wickham-Jones & Dalland 1998: Fig 2)

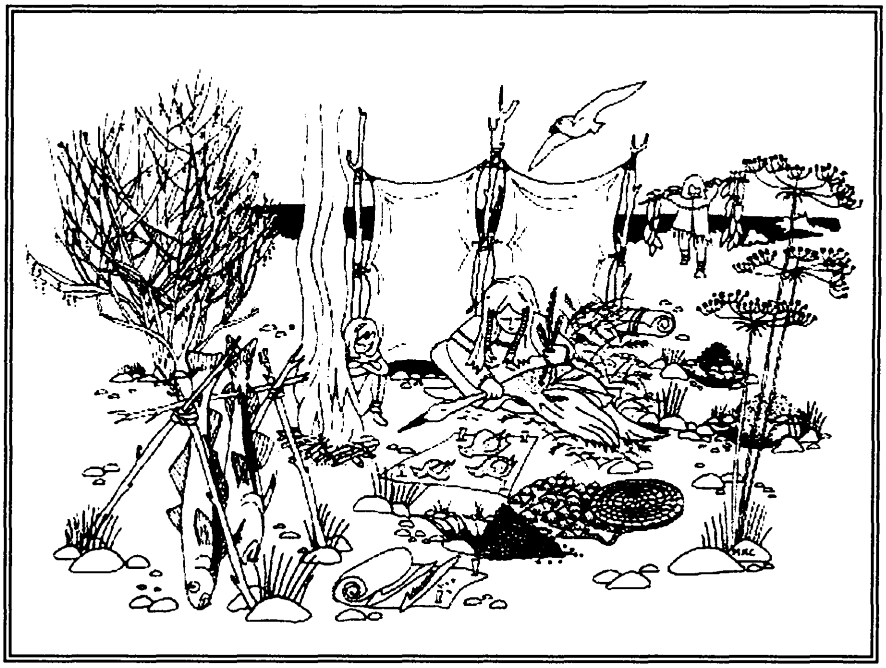
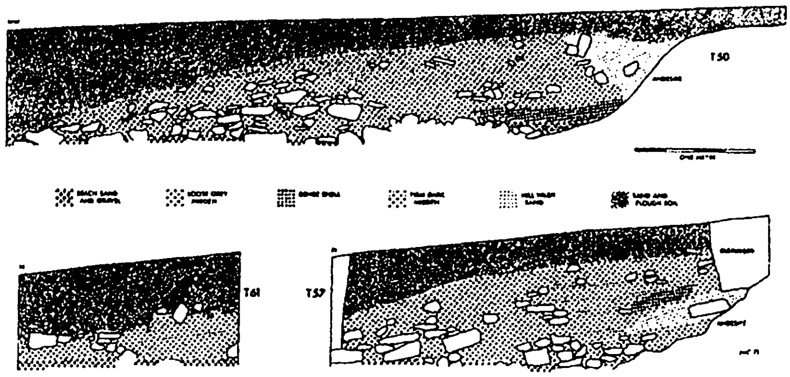
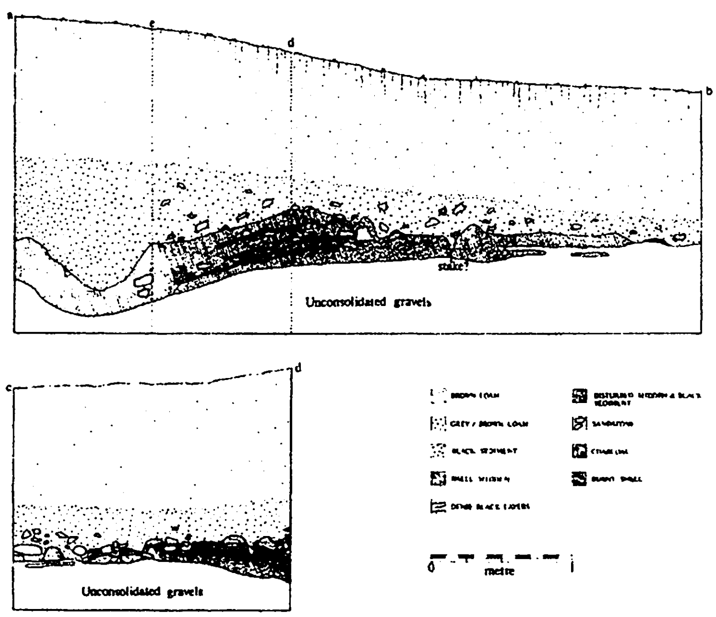


Figure 11: Fife Ness reconstruction (Wickham-Jones & Dalland 1998: Figure 12)

Morton B
(Coles 1971, Fig 30)



Muirtown, Inverness
(Myers & Gourlay 1991, Fig 3)



Polmonthill
(Lacaille 1954, Fig 63)

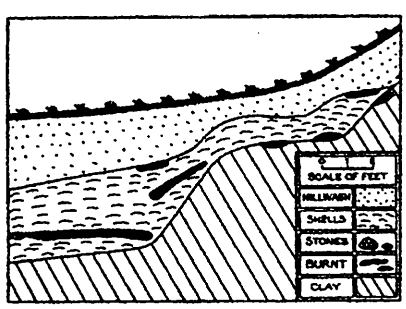


Figure 12: Middens from Eastern Scotland

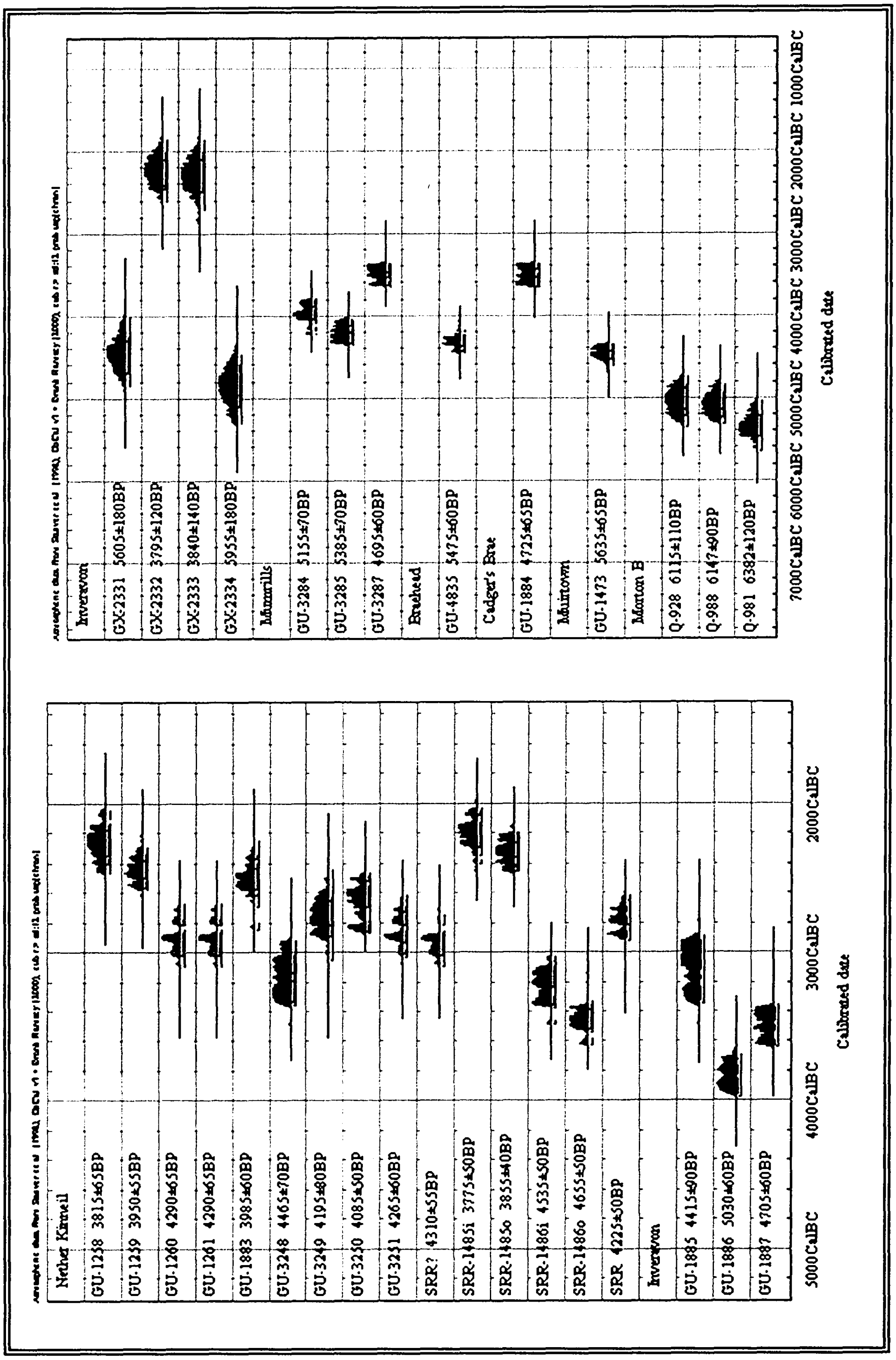


Figure 13: Calibrated radiocarbon dates

Site Name	Lab Ref	Detail	date	adjusted for shell	Reference
Nether Kinneil	GU-1258	NK79CXII F533 shell midden	4220±65	3815	Sloan 1993
Nether Kinneil	GU-1259	NK79CXIX F121 shell midden	4355±55	3950	Sloan 1993
Nether Kinneil	GU-1260	NK79CXVI F582 shell midden	4695±65	4290	Sloan 1993
Nether Kinneil	GU-1261	NK79CXVII L4105 shell midden	4695±65	4290	Sloan 1993
Nether Kinneil	GU-1883	Shell from shell midden	4390±60	3985	Sloan 1993
Nether Kinneil	GU-3248	Shell from shell midden	4870±70	4465	Sloan 1993
Nether Kinneil	GU-3249	Shell from shell midden	4600±80	4195	Sloan 1993
Nether Kinneil	GU-3250	Shell from shell midden	4490±50	4085	Sloan 1993
Nether Kinneil	GU-3251	Shell from shell midden	4670±60	4265	Sloan 1993
Nether Kinneil	SRR? o	Shell outer from shell midden	4715±55	4310	Sloan 1993
Nether Kinneil	SRR-1485i	Shell inner from shell midden	4180±50	3775	Sloan 1993
Nether Kinneil	SRR-1485o	Shell outer from shell midden	4260±40	3855	Sloan 1993
Nether Kinneil	SRR-1486i	shell inner from shell midden	4940±50	4535	Sloan 1993
Nether Kinneil	SRR-1486o	shell outer from shell midden	5060±50	4655	Sloan 1993
Nether Kinneil	SRR?	shell outer from shell midden	4630±50	4225	Sloan 1993
Muirtown Invemess	GU-1473	Bulk oak charcoal recovered from undemeath largest of the charcoal lenses towards base of midden	5635±65	5635	Myers and Gourlay 1991
Inveravon,	GU-1885	shell from shell midden	4820±90	4415	Mackie 1972, 413-4
Inveravon	GU-1886	shell from shell midden	5435±60	5030	Mackie 1972, 413-4
Inveravon,	GU-1887	shell from shell midden	5110±60	4705	Mackie 1972, 413-4
Inveravon,	GX-2331	shell base of shell midden, on the gravel	6010±180	5605	Mackie 1972, 413-4
Inveravon,	GX-2332	shell from middle of shell midden, 3.6 ft above the gravel	4200±120	3795	Mackie 1972, 413-4
Inveravon,	GX-2333	shell from near top of shell midden, 6 ft above the gravel	4245±140	3840	Mackie 1972, 413-4
Inveravon,	GX-2334	Charcoal in occupation material in shell mound 3.55 ft above the gravel	5955±180	5955	Mackie 1972, 413-4
Morton B	Q-928	T50/59 – upper midden	6115±110	6115	Coles 1971
Morton B	Q-988	T50.1/3 – lower midden	6147±90	6147	Coles 1971
Morton B	Q-981	T50.5,T57.2 – lower midden	6382±120	6382	Coles 1971
Morton B	NZ1194	T50.1/2/3/various midden	12200±240	12200	Coles 1971
Braehead	GU-4835	Shell from midden	5880±60	5475	Ashmore & Hall
Cadger's Brae	GU-1884	Shell from midden	5130±65	4725	Sloan 1993
Mumrills	GU-3284	oyster shell (outer). See also GU-3285, 5790 +/- 70 BP for inner part of same shell	5560±70	5155	Bonsall *et al* forthcoming
Mumrills	GU-3285	oyster shell (inner). See also GU-3284, 5560 +/- 70 BP for outer part of same shell	5790±70	5385	Bonsall *et al* forthcoming
Mumrills	GU-3287	shell from midden	5100±60	4695	Bonsall *et al* forthcoming

Figure 14: Radiocarbon dates from middens in eastern Scotland

Species	Common Name	Quantity
Atriplex patula L	Iron Root	7 seeds
Chenopodium album L	Fat hen	4 seeds
Polygonum aviculare agg.	Knotgrass	I nutlet
Scleranthus annus L.	Annual knawel	1 calyx
Spergula arvensis L	Corn spurrey	c10 seeds
Stellaria media (L.) vill	Chickweed	2 seeds
Betual Pendula Roth	Silver Birch	1 fruit

Figure 15: Macrofossil assemblage from Morton B

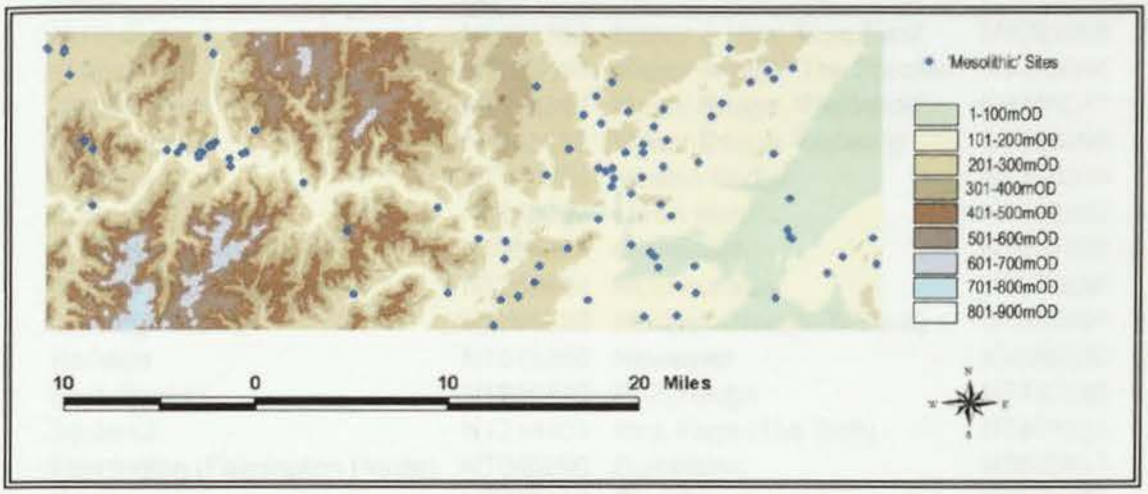


Figure 16: Distribution of all claimed mesolithic sites in the Tweed Valley

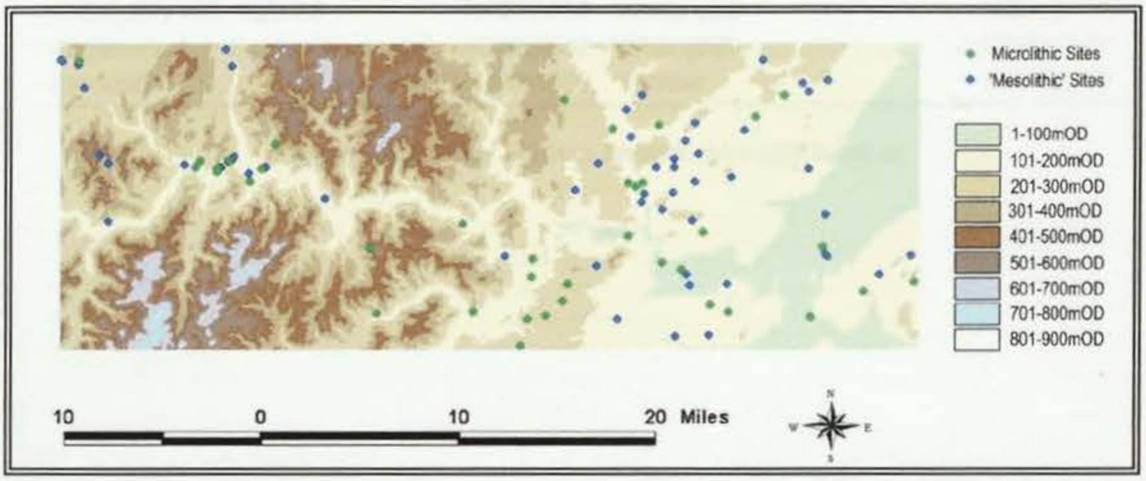


Figure 17: Distribution of all known microlithic sites and all claimed mesolithic sites in the Tweed Valley

Note: the distribution of microlithic sites in Figure 17 is not complete and does not represent the full range of prehistoric activity. The intention of the figure is to demonstrate that there is no meaningful distinction between known microlithic sites and claimed sites.

Name	NGR		
Ashiestiel	NT428352	Manor Bridge: 'Cow Field'	NT229398
Blainslie	NT550430	Manor Bridge: 'The Popples'	NT229396
Cavalry Park	NT264397	Manor Bridge: 'Plantation'	NT228397
Clackmae	NT563638	Manor Bridge: 'Bellanrig'	NT228394
Clarilawmoor	NT510289	Meldon Bridge	NT210398
Craigsford Mains	NT569382	Minch Moor	NT352332
Crookston Burn	NT254386	Muircluegh	NT511453
Dookits, Hay Lodge Park	NT239404	Muirhouselaw	NT630286
Dryburgh Mains	NT590320	Neidpath Haugh (N Bank)	NT237404
Earlston	NT575385	Newstead	NT563342
East Gordon	NT666440	Philiphaugh	NT437280
Edston 2	NT214403	Rink Farm (The Rink)	NT485323
Fairnington (Fairnington House)	NT645280	Rumbleton	NT690457
Fens	NT606314	Smedheugh	NT493277
Greenhill	NT475252	South Common Farm	NT481274
Kalemouth	NT712276	Springwood Park	NT721633
Kittlegairy Hill, 12/3/88	NT275417	White Law	NT514303
Legerwood	NT587643	Whitrighill	NT624345
Lindean	NT484308	Yarrow	NT358279

Figure 18: Tweed Valley: known microlithic sites

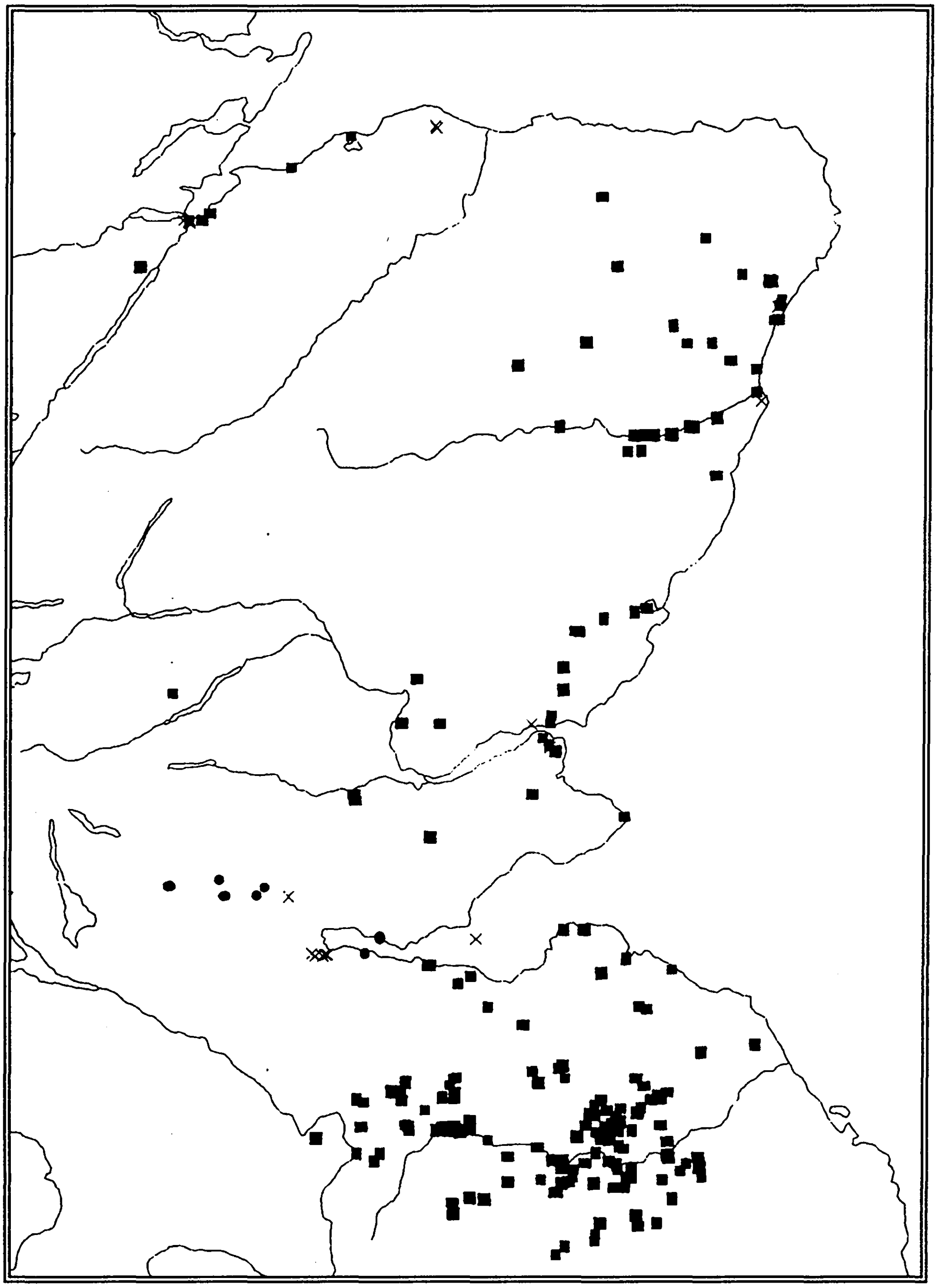


Figure 19: Distribution of mesolithic finds in Eastern Scotland

Square: Lithic site, Cross: midden, Circle: antler/bone tool

NAME	ngr	Type	NAME	ngr	Type
42 St. Paul Street, Aberdeen	NJ941065	lithic	Cadger's Brae	NS929794	midden
45-59 The Green, Aberdeen	NJ941060	lithic	Cammerlaws	NT655505	lithic
Airhouse Farm	NT480530	lithic	Cardross	NS600970	antler
Airhouse, Parkfoot	NT488536	lithic	Carmichael Church	NS924383	lithic
Airthrey Castle	NS817964	antler	Carwood Farm	NT029404	lithic
Ardlethen	NJ917317	lithic	Castle St, Invemess	NH667457	lithic
Ardtannes	NJ762201	lithic	Castlehill	NO657921	lithic
Ashiestiel	NT428352	lithic	Causewayhead	NS800950	antler
Banchory, Mount St	NO693961	lithic	Cavalry Park	NT264397	lithic
Ben Lawers	NN614392	lithic	Cessford	NT735235	lithic
Berry Hill	NT723360	lithic	Clackmae	NT563385	lithic
Birkenside	NT565423	lithic	Clairlaw	NT554274	lithic
Birkwood, Banchorry	NO710956	lithic	Clarilawmoor	NT510289	litihc
Blackness Bay	NT043806	antler	Clashpock Rig	NT132408	lithic
Blainslie	NT550430	lithic	Comhill Farm	NT018347	lithic
Blairdrummond	NS712981	antler	Cortleferry	NT433500	lithic
Blakelaw	NT768310	lithic	Craig Starcie	NJ974301	lithic
Blebocraigs	NO426152	lithic	Craigsford Mains	NT569382	lithic
Boat of Fechil	NJ976301	lithic	Cramond	NT190770	lithic
Bonnyton	NO666559	lithic	Crichness	NT684660	lithic
Boon	NT574457	lithic	Crichton Home Farm	NT400626	lithic
Bowdenmoor	NT537317	lithic	Crookston Bum	NT254386	lithic
Bowerhouse	NT495505	lithic	Crumhaugh Hill/Whitchesters/Southfield Farms	NT488130	lithic
Braehead	NS869937	midden	Culbin Sands	NJ033638	lithic
Bridge of Alford 2	NJ560170	lithic	Dalmaik	NO803985	lithic
Bridge of Don 1	NJ945101	lithic	Dalmeny Estate (Crammond site)	NT187770	lithic
Bridge of Don 2	NJ944100	lithic	Damhall	NT240481	lithic
Brockhouse	NT420523	lithic	Denholm	NT568183	lithic
Broomhall	NT610310	lithic	Devil's Burden, West Lomond Hill	NO193062	lithic
Broomhall	NT076838	antler	Dighty Water	NO474326	lithic
Broomhill	NJ405118	lithic	Dookits, Hay Lodge Park	NT239404	lithic
Broomhouse Mains	NT802562	lithic	Dryburgh Mains	NT590320	lithic
Brotherstone	NT615355	lithic	Dyce	NJ890120	lithic
Broughty Ferry	NO472311	lithic	Earlston	NT575385	lithic

Figure 20 (a): Sites used for Figure 19

Name	NGR	Type	Name	NGR	Type
East Gordon	NT666440	lithic	Grizzlefield	NT585398	lithic
East Morriston	NT609420	lithic	Guildton	NO132316	lithic
Eastfield	NT725469	lithic	Gullane Links	NT494857	lithic
Eddleston	NT242471	lithic	Halliburton	NT672486	lithic
Edinburgh; The Meadows	NT255725	lithic	Haremoss	NT465252	litihc
Edston 2	NT214403	lithic	Harrietsfield	NT629261	lithic
Eldinhope	NT299242	lithic	Hedderwick	NT638779	lithic
Elginhaugh	NT321673	lithic	Henderland	NT232232	lithic
Fairnington	NT645280	lithic	Heugh Head	NO502987	lithic
Fans	NT620409	lithic	Heugh-Head Farm	NO687927	lithic
Far Long Bank	NO531514	lithic	Hill of Logie	NJ977293	lithic
Fens	NT606314	lithic	Hill of Skares	NJ635337	lithic
Ferniehaugh	NT267398	lithic	Hope Burn, Kilbucho 30/6/90	NT060332	lithic
Fife Ness	NO636095	lithic	Huntlywood	NT617435	lithic
Fintray	NJ848162	lithic	Inchkeith	NT293830	midden
Flint Hill	NT136407	lithic	Inchmarlo Cottage	NO682960	lithic
Foveran Links 1	NK000240	midden	Ingraston Sand Quarry	NT115485	lithic
Foveran Links 2	NK004243	lithic	Inveravon	NS952798	midden
Foveran Links 3	NK005243	lithic	Invercannie	NO668964	lithic
Gallow Hill	NO529514	lithic	Inverness, Canal Rd	NH652457	midden
Garvald	NT098487	lithic	Inverness, Castle St	NH667457	midden
Garvald Burn	NT101486	lithic	Inverness, High St	NH667452	midden
Garvald Burn	NT102485	lithic	Inverness. Bank St	NH665454	midden
Glendearg	NT519379	lithic	Jedburgh	NT650200	lithic
Golf Course	NT240405	lithic	Kalemouth	NT712276	lithic
Gordon, East Mains	NT657429	lithic	Kersheugh	NT657171	lithic
Graden	NT796305	lithic	Kersknowe	NT755297	lithic
Greenhill	NT475252	lithic	Kilrubie Hill	NT217470	lithic
Greenlaw	NT710460	lithic	Kintore	NJ790160	lithic
Greenlawdean	NT705467	lithic	Kirkbuddo	NO502435	lithic
Green's Farm	NT020470	lithic	Kirkstead	NT264243	lithic
Durris Bridge/Crathes Main	NO750960	lithic	Kittlegairy Hill	NT275417	lithic
Grieve B	NO795981	lithic	Ladymire	NJ975299	lithic
Grieve J	NO710957	lithic	Leadketty	NO019158	lithic

Figure 20 (b): Sites used for Figure 19

Name	NGR	Type	Name	NGR	Type
Legerwood	NT587433	lithic	Nethermills Farm	NO758961	lithic
Lempitlaw	NT793326	lithic	Nethermills II	NO759963	lithic
Lindean	NT484308	lithic	New Mains/Caldercleugh	NT665667	lithic
Little Gight	NJ838398	lithic	Newmill	NT119463	lithic
Lochtower	NT802285	lithic	Newstead	NT563342	lithic
Mains of Waterton	NJ989300	lithic	Nigg Bay	NJ950040	midden
Manor Bridge: 'The Popples'	NT229396	lithic	North Berwick	NT540850	lithic
Manor Bridge 'Cow Field'	NT229398	lithic	Oak Brae (above Kilbucho Burn)	NT070348	lithic
Manor Bridge N River/E Road	NT228397	lithic	Oxnam	NT701182	lithic
Manor Bridge: 'Plantation'	NT228396	lithic	Palace Hill	NT601260	lithic
Manor Bridge S River/E Road	NT231398	lithic	Park, The	NT590364	lithic
Manor Bridge: D69Bellanrig	NT228394	lithic	Peebles 2	NT240404	lithic
Marnoch	NJ603494	lithic	Philiphaugh	NT437280	lithic
Maryculter Bridge (Grieve H)	NJ857005	lithic	Polmonthill	NS947796	midden
Maxton	NT613302	lithic	Purvishaugh	NT600398	lithic
Meiklewood	NS720950	antler	Quarry Rd	NO021143	lithic
Mellerstain	NT647390	lithic	Queen Street/Broad Street, Aberdeen	NJ943063	lithic
Menie Links 1	NJ989209	lithic	Rink Farm (The Rink)	NT485323	lithic
Menie Links 2	NJ991212	lithic	River Tweed	NT462325	lithic
Milton of Culloden	NH711470	midden	Rossie Mills	NO691563	lithic
Minch Moor	NT352332	lithic	Rumbleton	NT690457	lithic
Monikie	NO500385	lithic	Rutherford	NT644303	lithic
Montreathmont Moor	NO595545	lithic	Sands of Forvie 1	NK011256	lithic
Moorpark	NT923577	lithic	Sands of Forvie 2	NK010252	lithic
Morton 1	NO467257	lithic	Sandy Hill, Ingraston	NT114482	lithic
Morton 2	NO468261	lithic	School	NO539515	lithic
Mosshouses	NT538401	lithic	Scotscraig Burn	NO453278	lithic
Mountrich	NH562604	midden	Shiplaw	NT235495	lithic
Muirhouselaw	NT630286	lithic	Slipperfield	NT132506	lithic
Mumrills	NS921798	midden	Smedheugh	NT496277	lithic
Neidpath Haugh (N Bank)	NT237404	lithic	Sorrowless Field	NT574370	lithic
Nether Kinneil	NS958800	midden	South Common Farm	NT481274	lithic
Nether Kirkgate, Aberdeen	NJ942063	lithic	Springwood Park	NT721333	lithic
Nether Tofts	NT558142	lithic	Spurryhillock	**NO852861**	**lithic**

Figure 20 (c): Sites used for Figure 19

Spylaw	NT725325	lithic
Spynie	NJ225660	midden
Spynie Palace	NJ228658	midden
Stannergate	NO427310	midden
Stichill Hone Farm (Queens Cairn Wood)	NT710397	lithic
Stobo Hope Head	NT139401	lithic
Stoneyfield	NH694455	lithic
Summerhope	NT237210	lithic
Tentsmuir	NO480250	lithic
Tomess	NT743748	lithic
Trapain Law	NT579746	lithic
Tulloch Ard	NO219313	lithic
Upper Gothens	NO168414	lithic
Wallaceneuk	NT723327	lithic
West Morriston	NT600405	lithic
Westloch	NT250512	lithic
Weston Farm	NT034460	lithic
Whinny Hill	NT275740	lithic
Whitchesters	NT469111	lithic
White Hill	NT576376	lithic
White Law	NT514303	lithic
Whitefield	NT599377	lithic
Whitriggs Farm	NT560157	lithic
Whitrighill	NT624345	lithic
Whitslaid	NT561445	lithic
Yarlside	NT617386	lithic
Yarrow	NT358279	lithic

Figure 20 (d): Sites used for Figure 19

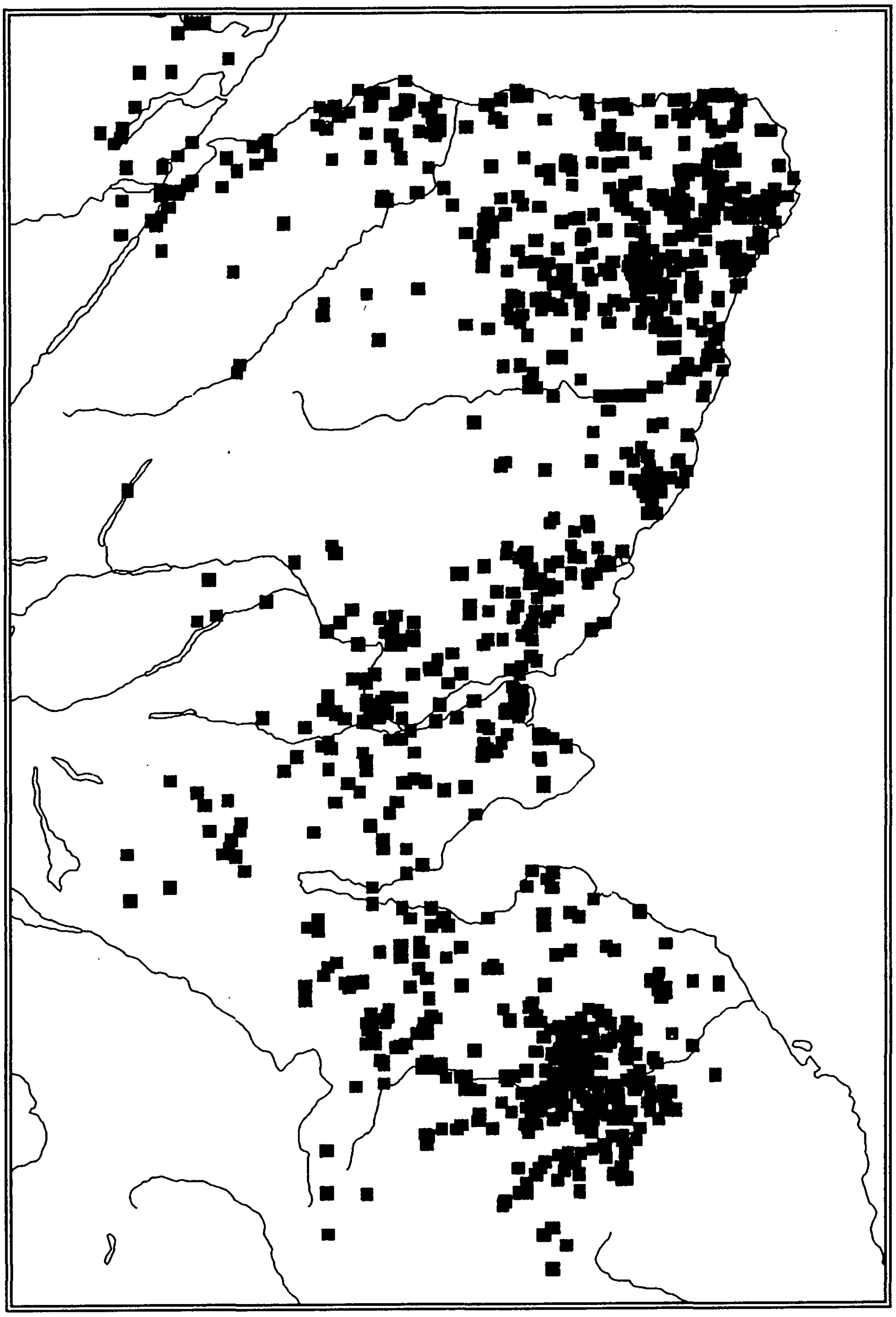


Figure 21: Distribution of all surface finds in Eastern Scotland:

information courtesy of LSP.

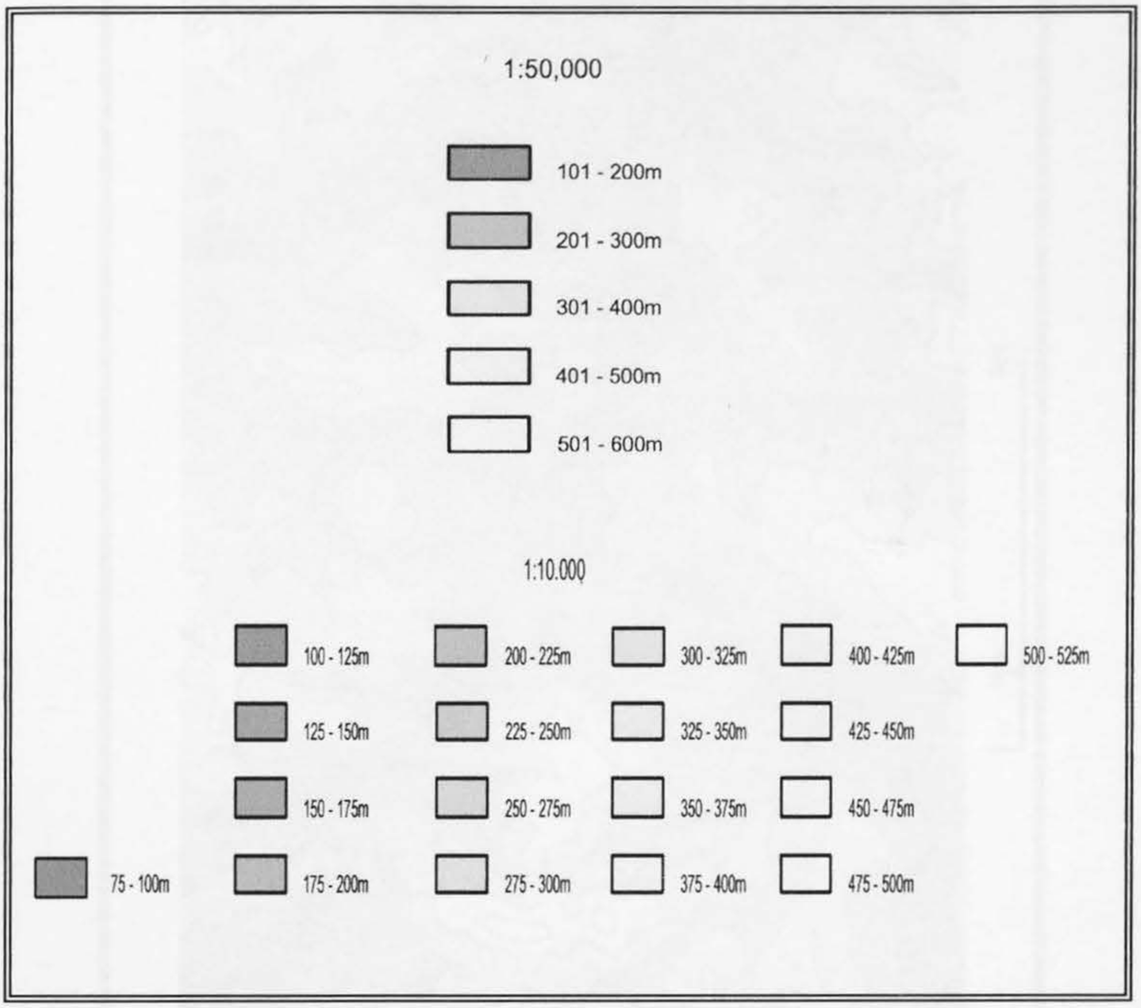


Figure 22: Key to location maps in Tweed Valley

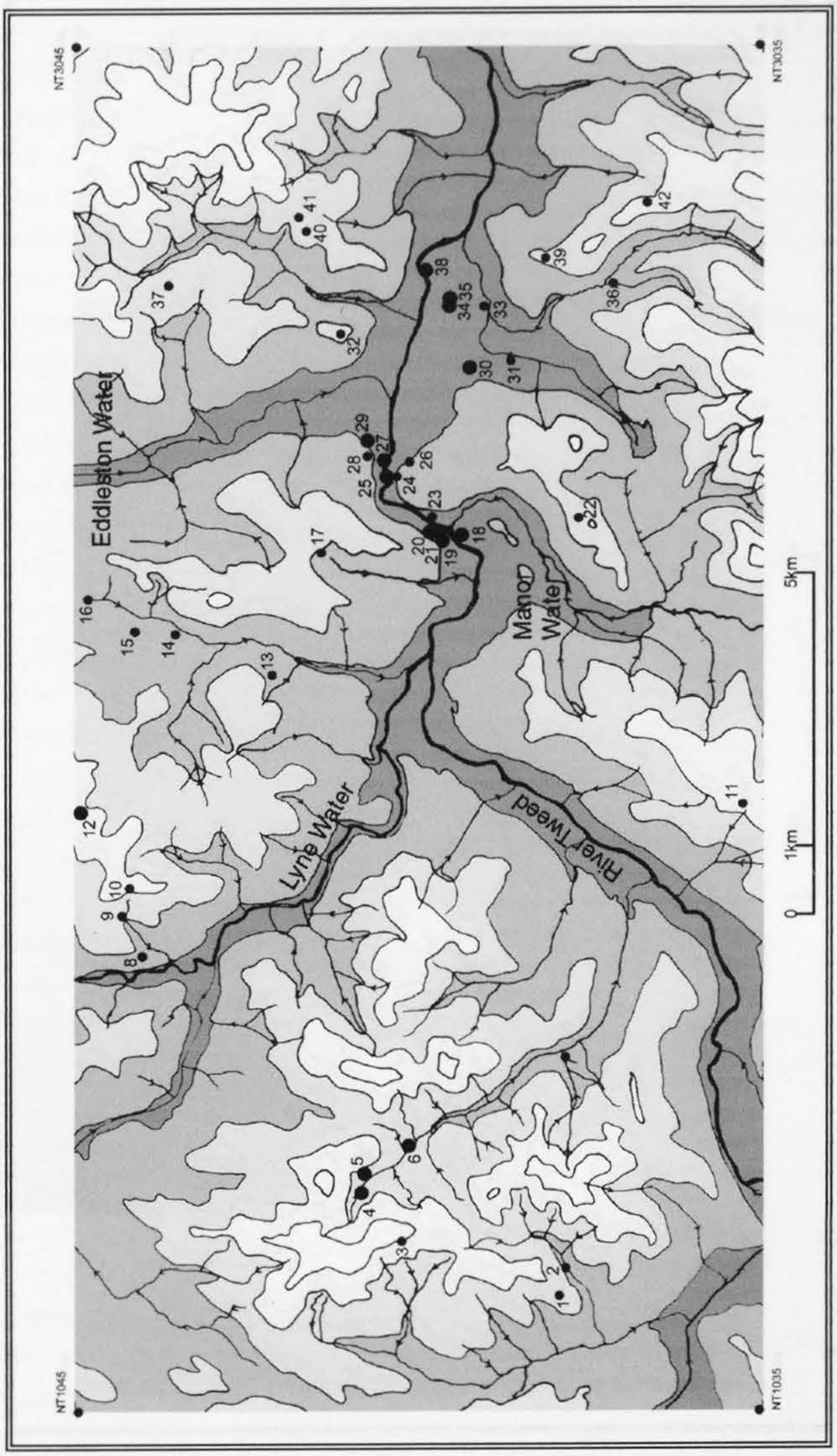


Figure 23: Distribution of Knox findspots

See Fig 24 for ID code. See Fig 22 for key. Some findspots beyond the limits of this map (see Figure 25)

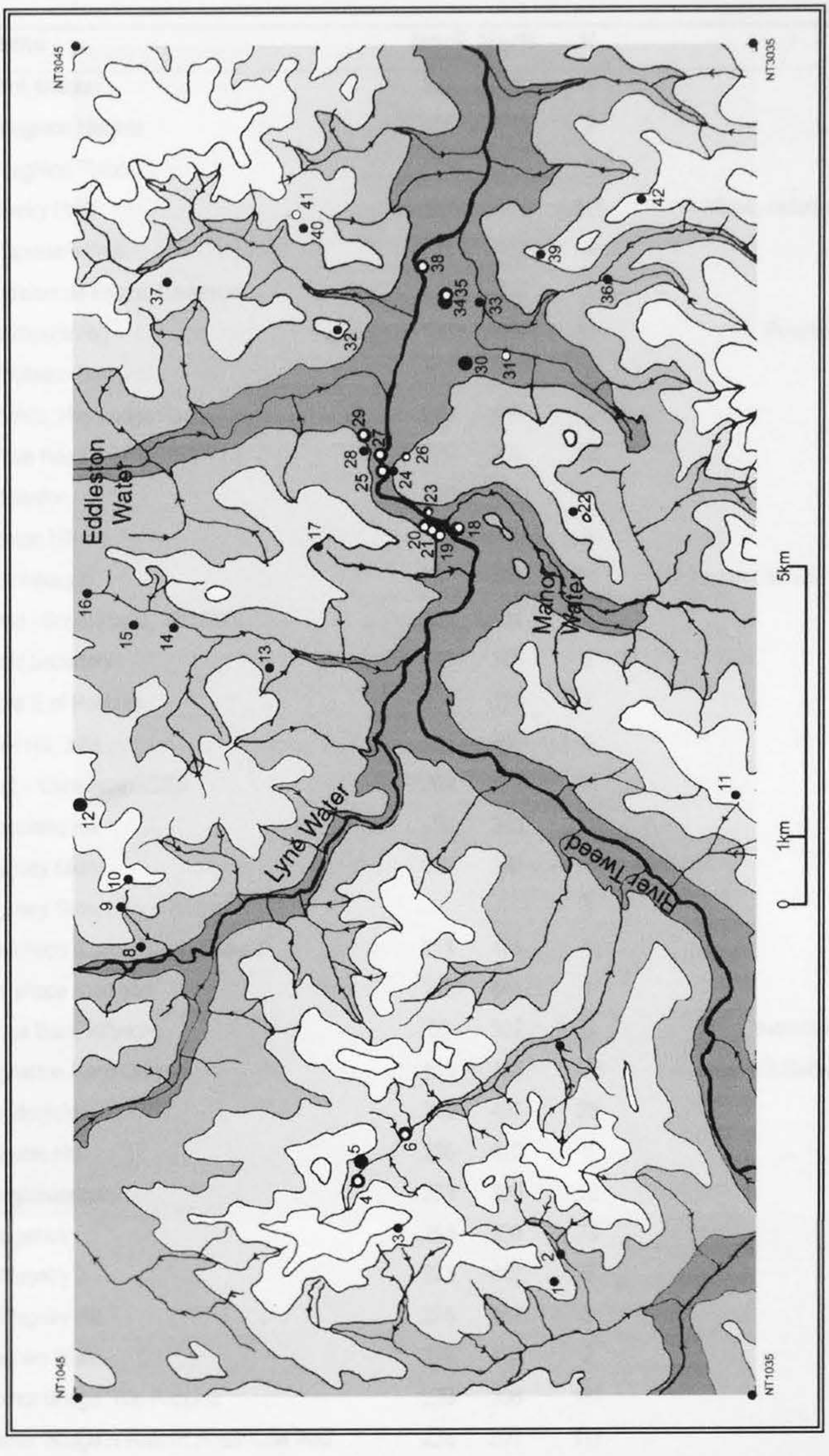


Figure 24: Distribution of Knox findspots: mesolithic sites identified by white spots See Fig. 25 for ID code. See Fig. 22 for key. Some findspots beyond the limits of this map (see Fig. 25)

ID	Name	NgrE	NgrN	N	Period
13	Black Meldon	207	421	1	Unk
3	Broughton Heights	125	402	2	Unk
2	Broughton Place	121	377	1	Unk
35	Cavalry Park	2635	3975	146	Mixed, includes mesolithic
	Chapman's Well	327	369	4	Unk
22	Chevaux de Frieze, Cademuir	231	376	1	Unk
4	Clashpock Rig	132	408	11	Possible mesolithic
31	Crookston Burn	254	386	1	Mesolithic
27	Dookits, Hay Lodge Park	239	404	107	Mesolithic
42	Drove Road	277	366	13	Unk
	Eddleston	245	471	4	Unk
17	Edston Hill	2260	4140	9	Unk
38	Ferniehaugh	267	398	71	Unknown (mesolithic-neolithic)
26	Field - South Parks, 17/12/90	239	401	1	Unk
1	Field boundary	117	379	2	Unk
	Field E of Peebles	309	379	2	Unk
5	Flint Hill, 3/84	135	408	3	Unk
39	Fort – Camphaw 9/3/85	269	382	1	Unk
	Goseland Hill	79	345	11	Unk
33	Gypsey Glen	262	390	4	Unk
	Gypsey Glen, Hoggs Bridge			1	Unk
14	Harehope (Cairn, Green Knowe)	214	435	1	Unk
15	Harehope road end	215	441	1	Unk
	Hope Burn, Kilbucho	60	332	9	Unk, includes mesolithic?
	Ingraston Sand Quarry	115	485	228	Mixed, includes mesolithic
29	Jedderfield	242	407	25	
	Kilrubie Hill	216	470	6	Unk
34	Kingsmeadows	263	395	10	Unk
30	Kingsmuir	253	393	73	Neolithic?
40	Kittlegairy 2	273	416	6	Unk
41	Kittlegairy Hill	275	417	3	Mesolithic
	Leithen Water	279	463	2	Unk
21	Manor Bridge 'The Popples'	229	396	187	Mesolithic
20	Manor Bridge N River/E Road 'Cow field'	228	397	117	Mesolithic
19	Manor Bridge N River/W Road ('Plantation')	228	396	45	Meso?
23	Manor Bridge S River/E Road	231	398	7	Meso?
18	Manor Bridge S River/W Road (Bellanrig)	228	394	30	Mixed, inc. meso

	Manorhead	204	262	1	Unk
	Merrybrae – downhill from site	314	371	1	Unk
	Merrybrae Enclosure	315	373	9	Unk, blade-core industry
25	Neidpath Haugh (N Bank)	237	404	36	Includes meso
37	North/South Knowe	265	436	2	Unk
16	off Drove Road to Nether Stewarton	219	448	1	Unk
	Path to Glensax	266	245	1	Unk
28	Path to Golf course	240	407	2	Unk
11	Path, Dead Wife's Grave to Dawych	188	352	1	Unk
7	Path, Stobohope	152	378	1	Unk
	Platforms, Parkgatestone Hill	89	356	8	Unk
	Portmore Loch, Eastside	261	506	6	Unk
	Ruddenleys	205	570	1	Unk
	Shiplaw	241	509	35	Mesolithic (broad blade?)
24	South Park Wood, opposite Neidpath Castle	237	403	7	Unk (meso-neo)
9	Stevenson Burn	173	443	8	Unk
10	Stevenson Hill				
6	Stobo Hope Head	139	401	22	Possible mesolithic
36	Upper Newby	265	372	3	Unk
32	Venlaw Hill	258	412	1	Unk
	Whitelawburn	230	479	3	Unk
12	Wide Hope Shank	187	449	134	Unknown
8	Wood Hill	167	440	15	Unknown

Figure 25: All Knox findspots

All NGR's NT.......

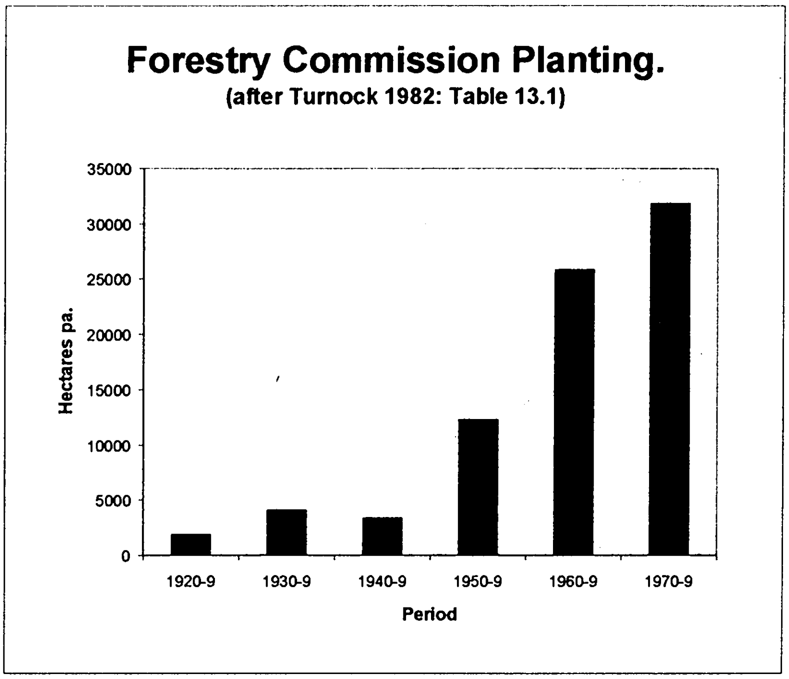


Figure 26: Forestry Commission Planting in Scotland:

Figures do not include private enterprises

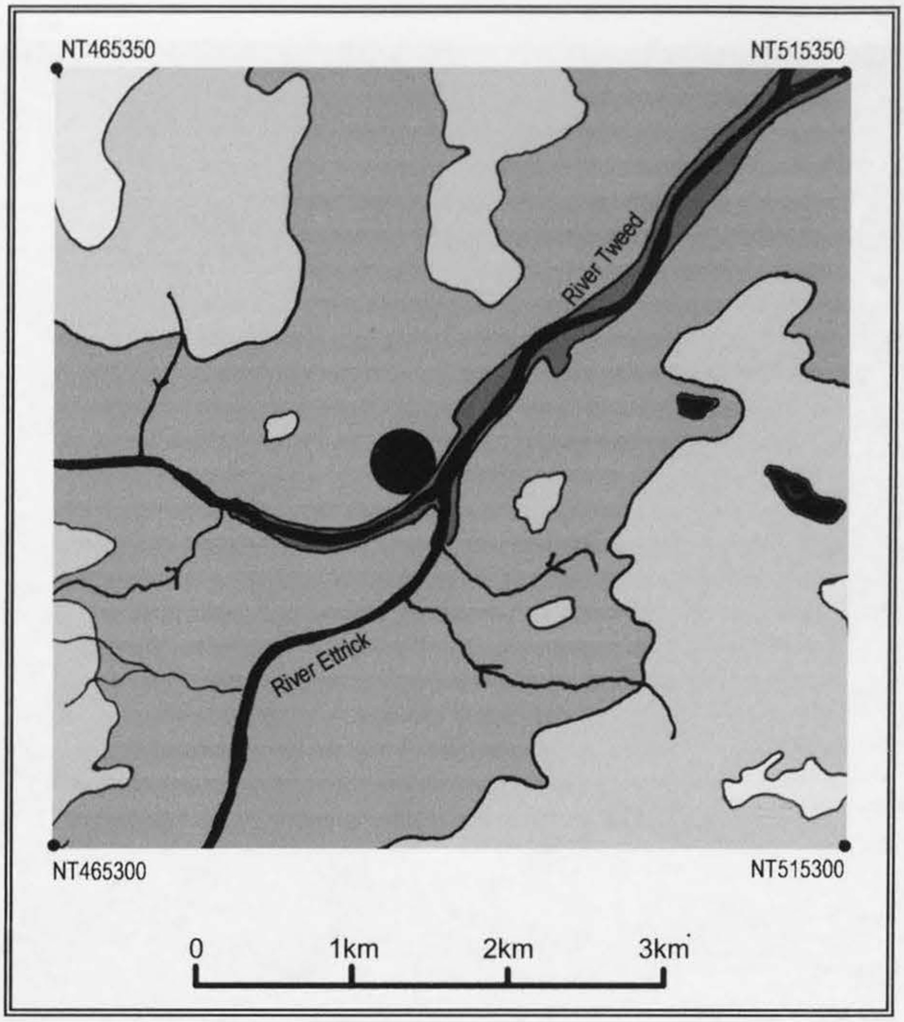


Figure 27: Rink Farm: regional landscape (see Fig. 22 for key)

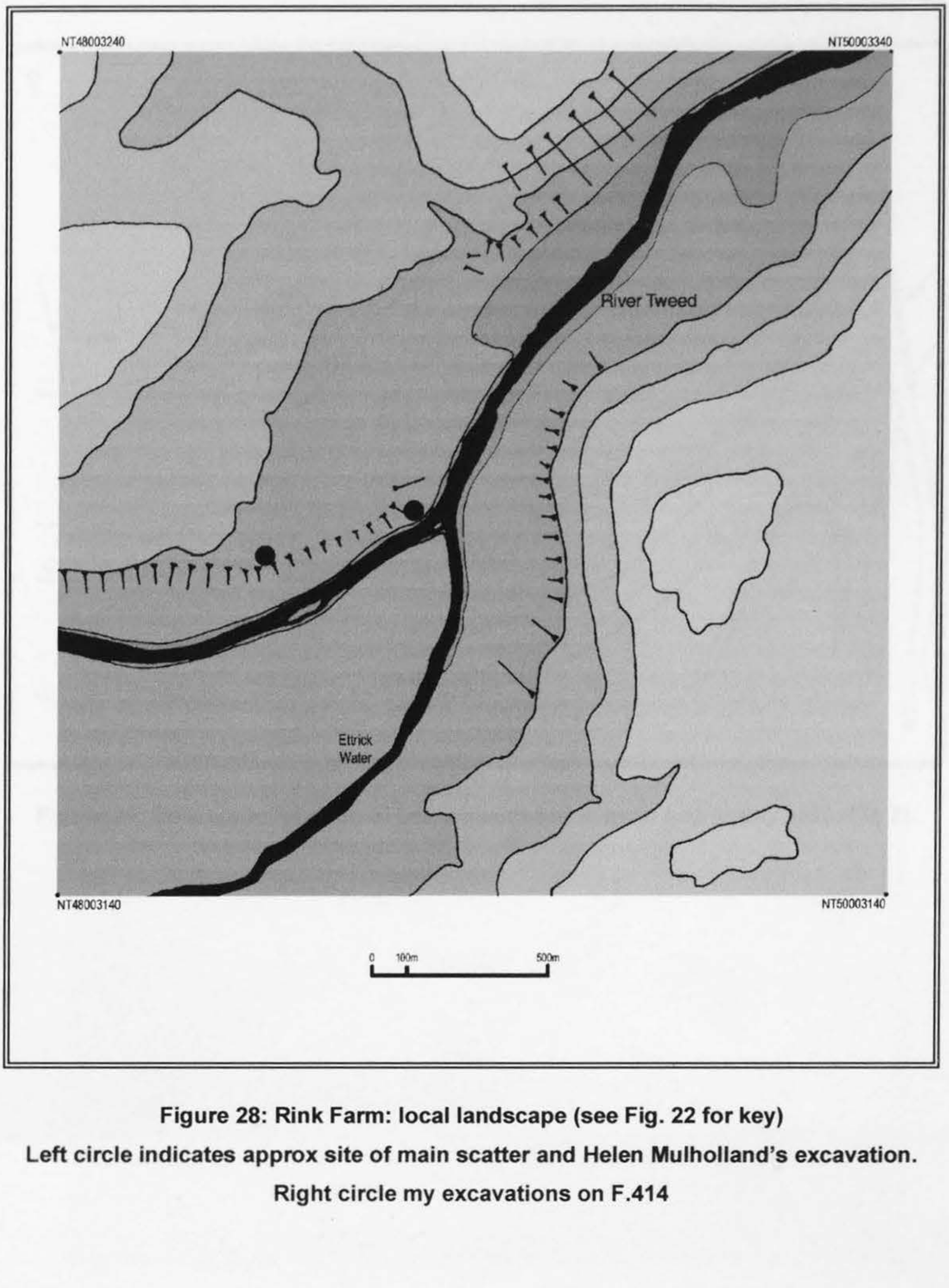


Figure 28: Rink Farm: local landscape (see Fig. 22 for key)

Left circle indicates approx site of main scatter and Helen Mulholland's excavation.

Right circle my excavations on F.414

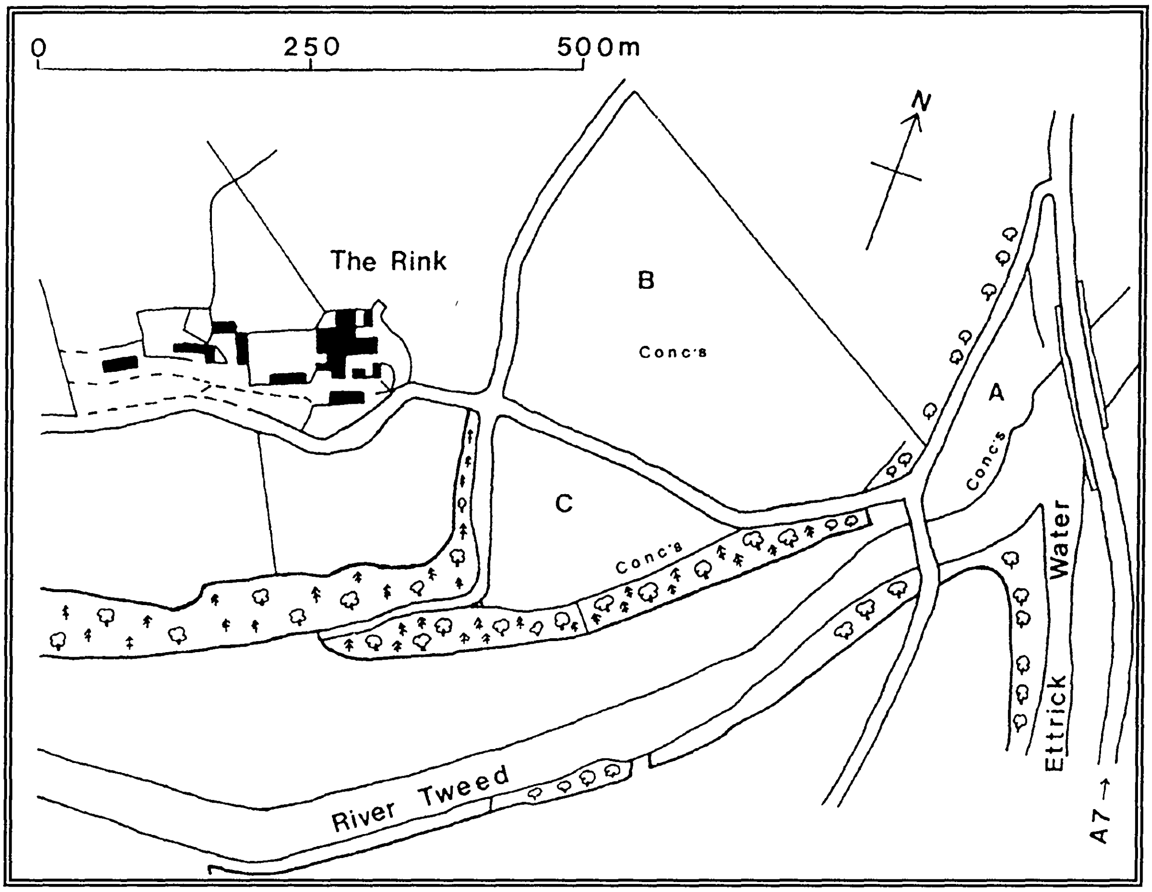


Figure 29: Rink Farm: location of fields discussed in main text (Haley 1990: Fig 2).

Figure 30: Rink Farm: Aerial view of junction of rivers Tweed and Ettrick (image ©W Elliot)

Approx. site of recent excavations marked by arrow. Image dates to before completion of new road bridge (at right) and before construction of access ramp (Fig. 35).

Figure 31: Rink Farm: Surface finds from F.414 (image ©W Elliot)

Figure 32: Rink Farm: View of Helen Mulholland's excavations in Field C (image ©W Elliot)

Figure 33: Rink Farm: view of east riverside terrace Field A (F.414)

Trench in far left corner of field. Note slope across terrace at far end near access track.

Figure 34: Rink Farm: view of west riverside terrace F398

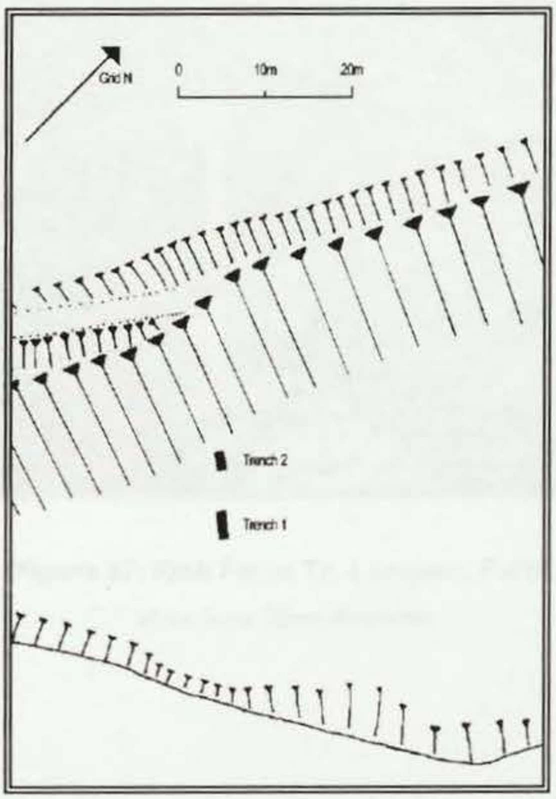


Figure 35: Rink Farm: plan Field A (F.414)

Figure 36: Rink Farm: feature Tr. 3, F.398 (C.3002)

Main scale 20cm divisions, secondary scale 5cm subdivsisions

Figure 37: Rink Farm: Tr. 1 section, F.414.

Main scale 20cm divisions.

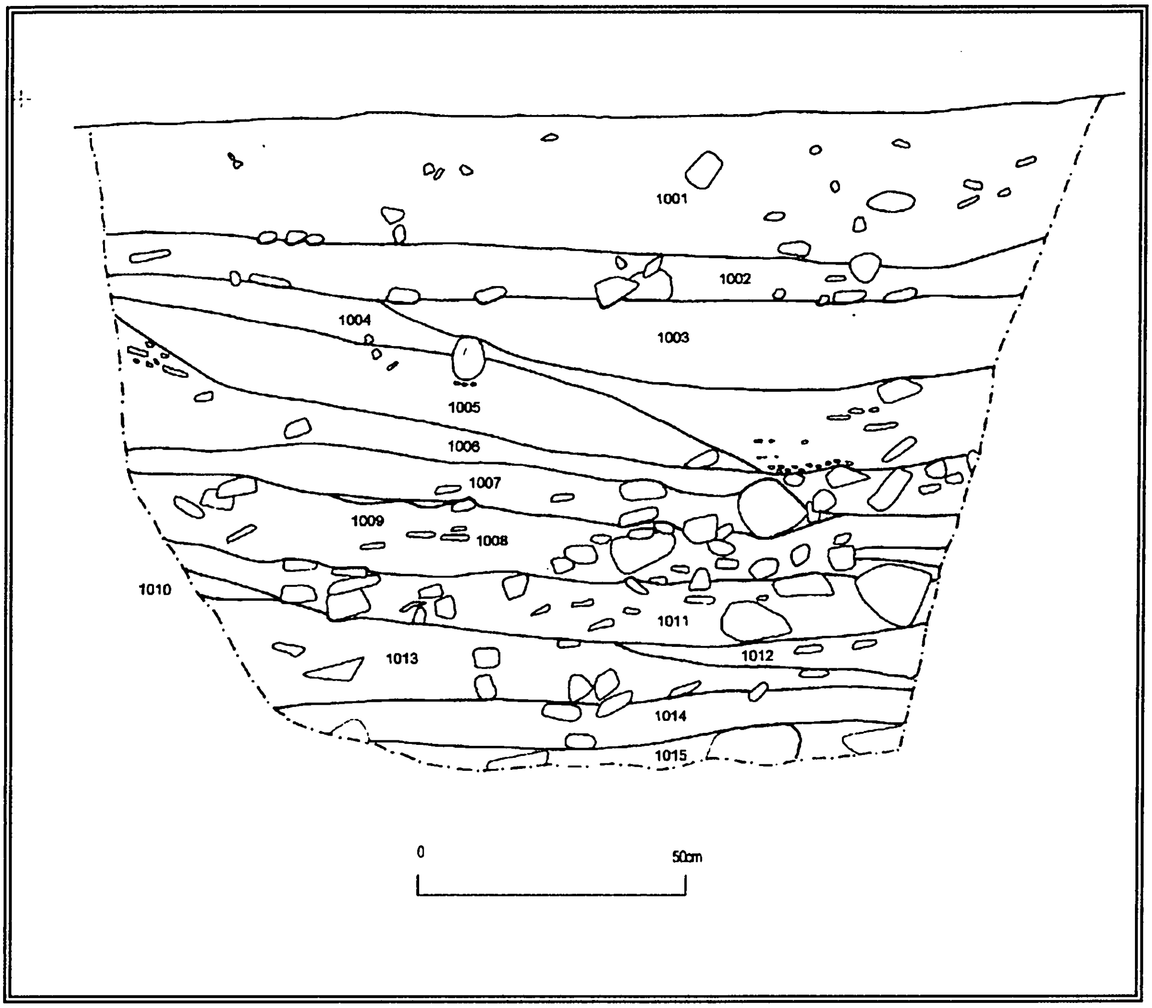


Figure 38: Rink Farm: Tr.1 East facing section

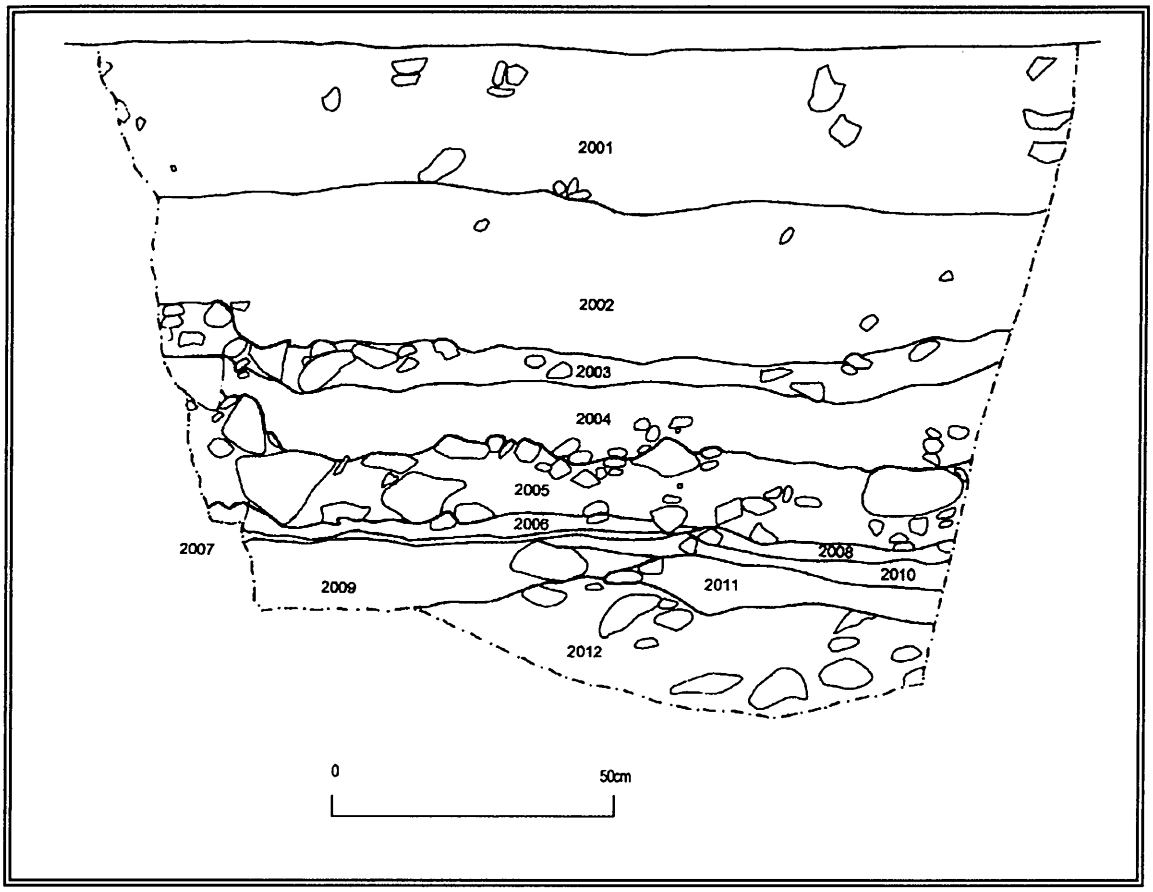


Figure 39: Rink Farm: Tr.2 East facing section

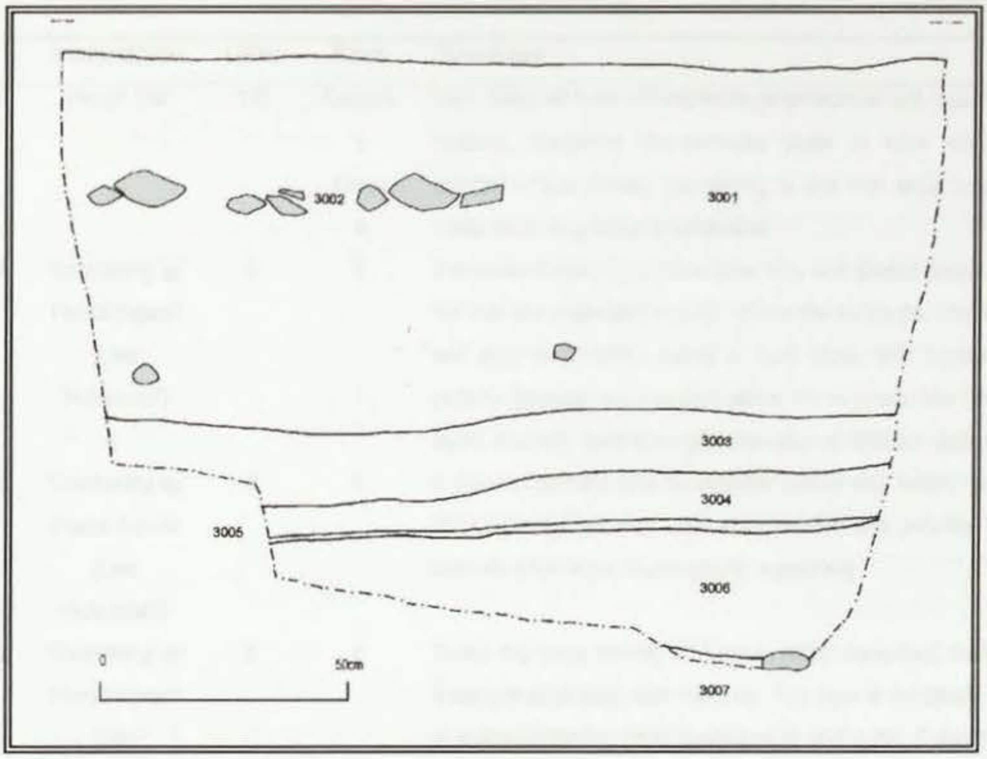


Figure 40: Rink Farm: Tr.3 North facing section

Figure 41: Rink Farm: Tr.3 North facing section

ID	Interpretation	Lithic	Finds	Description
1001	Plough Soil	115	Ceramic 5 Glass 4	Dark brown silt loam with moderate proportions of well humified organic material. Containing few-moderate clasts of local stones, mainly rounded or sub-rounded and varying in size from small to large, these clasts show no grading or imbrication.
1002	'Coarsening up' Fluvial deposit (Late Holocene?)	0	0	Tan-brown coarse sand-gravel lens, fairly well graded (larger material to the top) and imbricated at 0-20° above the horizontal. Clasts are small and platy in character mainly of local stone, with occasional larger pebbles (possibly intrusive from above where plough has disturbed this layer). Probably continuous with deposition of 1003 but distinct in type.
1003	'Coarsening up' Fluvial deposit (Late Holocene?)	0	0	A firm tan silt-sand lens increasingly coarse with height, (max. height 20cm) grading into very small platy pebbles and possibly 1002. Also includes a few larger stones (matrix supported).
1004	'Coarsening up' Fluvial deposit (Late Holocene?)	0	0	Varied tan loose gravels 5-15 cm in depth comprised mainly of very small and small platy local materials. This layer is not clearly imbricated or sorted but the few larger clasts tend to sit at 0-20°. Gravel is generally supported by the coarse sand matrix and the lens is almost entirely inorganic. Possibly contiguous with 1005?
1005	'Coarsening up' Fluvial deposit (Late Holocene?)	0	0	A firm tan silt-sand lens increasingly coarse with height, (max. height 20cm) grading into very small platy pebbles of local materials the few larger clasts tend to sit at 0-20°. And possibly into context 1004 above.
1006	Fluvial gravel (Younger Dryas?)	0	0	Grey loose matrix supported gravel deposit, 5-15cm in height, comprised of very small –medium rounded sub-rounded platy and spherical local material. Banding and grading is quite clear amongst the smaller material although slightly disturbed by the presence of larger material. Most of the smaller material sits horizontally. No organic content. Possibly slightly truncated by 1005 above.
1007	Fluvio-glacial gravels. (Younger Dryas?)	0	0	Coarse tan sand-gravel matrix supported lens (5-15cm). Clasts are very small and small rounded/sub-rounded local material and the occasional larger platy material. There is no clear imbrication or grading. Clearly differentiated from layers beneath by differential erosion.
1008		0	0	Firm compacted 20-30cm layer of tan sand. Frequent clasts range from small to large, medium and large material is common. These are sub-angular/sub-rounded and seem to be imbricated at c0-10° and are often surrounded by smaller material with hints of grading and banding. There is no organic material in the lens.
1009	Fluvio glacial gravels.	0	0	Thin lenses (1-3cm) of very loose clast supported pure gravel comprised of very small platy rounded local material. (At base of 1007).
1010		0	0	Tan-yellow firm medium-fine sands (c5cm) containing low frequencies of large clasts (possibly sand in-filling matrix?). No indications of

				imbrication and sorting.
1011	Fluvial-glacial gravels (Late Devensian)	0	0	Firm compacted 10-20cm layer of tan-orange sand. Very frequent clasts range from small to very large, medium and large material is common. These are mainly sub-angular with a few sub-rounded and seem to be imbricated at c0-10° and are often surrounded by smaller material with hints of grading and banding. There is no organic material in the lens.
1012	Fluvial-glacial gravels (Late Devensian)	0	0	Grey varied loose gravel layer (0-10cm) possibly slightly discontinuous horizontally. Comprised of small and very small clasts (rounded/sub-rounded platy local material). No imbrication or banding.
1013	Fluvial-glacial gravels (Late Devensian)	0	0	A tan loose sand gravel (5-25cm in height) with slighlty indistinct boundaries. Notable as looser than surrounding material and matirx supported. The layer is comprised mainly of small and medium platy rounded/sub-rounded but has an important minority of larger sub-angular material. Most of the material is Southern Uplands local.
1014	Fluvial-glacial gravels (Late Devensian)	0	0	Tan-orange loose/compacted sand layer (5-15cm) with a high proportion of spherical rounded/sub-rounded large and medium clasts. These clasts are not clearly imbricated or sorted.
1015	Fluvial-glacial gravels (Late Devensian)	0	0	Tan-orange compact sand layer with a high proportion of all clasts including large and very large sub-angular and sub-rounded boulders. The depoist is partly cemented and does not show any clear signs of imbrication.
1016	Fluvial-glacial gravels (Late Devensian)	0	0	Small lenses (0-10cm high) of almost pure orange sand with 1008. Few clasts incluse small platy material. Suggests that 1008 not a single deposition?

Figure 42: Rink Farm: Context descriptions, Tr.1 Contexts 1001-1005 sieved.

ID	Interpretation	Lithic	Finds	Description
2001	Plough Soil	13	Ceramic 5 (10) Glass 4 (8)	Dark brown silt loam with moderate proportions of well humified organic material. Containing few-moderate clasts of local stones, mainly rounded or sub-rounded and varying in size from small to large, these clasts show no grading or imbrication
2002	Colluvium	Sieve 7 Hand 16	Ceramic 5 (10) Glass 1 (2)	A firm dark tan silt layer (25cm) with very few small sub-rounded clasts of local stone and many flecks of charcoal (including some large pieces). Finds included lithics, glass and post medieval ceramics.
2003	Fluvial-glacial gravels	0	0	A tan loose-firm sandy-gravel (10-15cm) with moderate-frequent clasts (clast supported in some areas, matrix in others). No clear evidence of grading or imbrication. Clasts are small-medium sub-rounded and rounded and comprised of local material.
2004	Fluvial-glacial gravels	0	0	A 15cm layer of light red-brown loose sandy silt layer including frequent small-large clasts sub-angular through to rounded (matrix supported). No clear imbrication or grading. No organic material.
2005	Fluvial-glacial gravels (Late Devensian)	0	0	20cm deep layer of red-brown sandy silt surrounding clast supported medium-large rounded-sub angular local stones. Many show evidence of breakage. No clear sorting, some imbrication (c30° from horizontal).
2006	Fluvial-glacial gravels	0	0	5cm lens of grey-brown loose fine sandy-gravel comprised of very small platy rounded material. Larger clasts are absent. No evidence for grading/imbrication.
2007	Fluvial-glacial gravels	0	0	A light tan silty sand lens with few small clasts (rounded-sub rounded platy). There is no clear imbrication or sorting within this 5cm thick layer. (Continuation of 2008)
2008	Fluvial-glacial gravels	0	0	A light tan silty sand lens with few small clasts (rounded-sub rounded platy). There is no clear imbrication or sorting within this compacted 3-5cm thick layer. (Continuation of 2007)
2009	Fluvial-glacial gravels	0	0	Compacted 15cm layer of light brown inorganic silty sand which contains few clasts. Occasional larger material.
2010	Fluvial-glacial gravels	0	0	Dark-grey brown very loose sand gravel layer (5cm deep). Containing frequent small and very small platy clasts and no larger material.
2011	Fluvial-glacial gravels	0	0	Firm light tan sandy silt layer 20cm deep containing moderate amounts of matrix supported small-large clasts ranging from rounded to angular material including some clearly broken material. There is no evidence for imbrication or sorting.
2012	Fluvial-glacial gravels (Late Devensian)	0	0	Dark grey brown loose sandy gravels 25 cm in depth and not fully excavated containing frequent clasts from small to large with an important component of large sub-angular matrix supported clasts which show some evidence for damage.

Figure 43: Rink Farm: context descriptions, Tr.2 (50% of contexts 2001-2003 sieved)

ID	Interpretation	Finds	Description
3001	Overbank silts (?Late Holocene)	1 glass	Large firm deposit c70-80cm in depth comprised of fine silts and sands (possibly in discrete grading up units although heavily bioturbated) Only clasts are large charcoal chunks.
3002	Unknown stone feature	0	Small layer of large angular/sub-angular platy stones laid horizontally with 3001.
3003	OLS?	0	Grey with orange tan fine silt sand layer (15-18cm in depth) with an undulating indistinct upper horizon. No clasts of any kind
3004		0	Tan-orange gravel sand loose/compacted layer with clear horizontal imbrication of the very numerous small and very small clasts of platy/rounded material.
3005		0	Very thin (2-4cm) orange layer of small-medium rounded and sub-rounded local stones. The layer is cemented by a iron pan.
3006		0	Grey sands with orange oxidisation clearly visible. No clasts or no organic material and a very firm compacted layer 10-25cm thick of medium sands.
3007		0	Loose/compacted grey and orange gravel and sand layer including moderate amounts of large and medium matrix supported clasts (mainly rounded/sub-rounded local material). The layer is 5cm deep but not fully excavated.

Figure 44: Rink Farm: Context descriptions, Tr.3

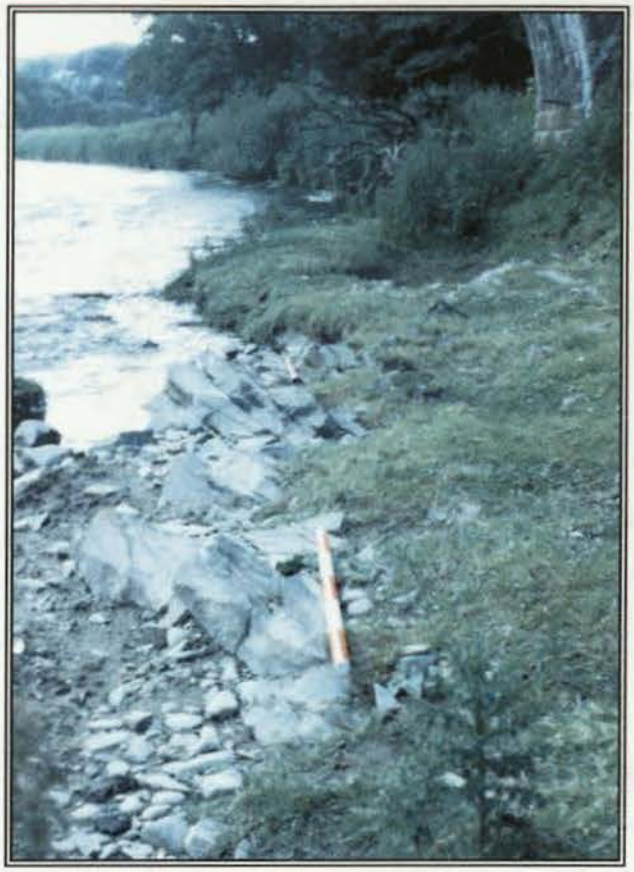


Figure 45: Rink Farm: exposed bedrock at Rink Bridge, within 30m of trenches on F414.

Scales in 20cm subdivisions.

Type	Total	Type as % total	Flint	Type as % mat.	Chert	Type as % mat.	Chalcedony	Type as % mat.
Flake - Regular	44	30.1	9	39	34	29.1	1	16.7
Flake - Irregular	38	26	3	13	34	29.1	1	16.7
Blade	11	7.5	3	13	7	6	1	16.7
Core	5	3.4	2	9	3	2.6	0	0
Chunk	46	31.5	6	26	37	31.6	3	50
Bashed Lump	2	1.5			2	1.6	0	0
Total	146	100	23	100	117	100	6	100.1

Figure 46: Rink Farm: composition of excavated assemblage

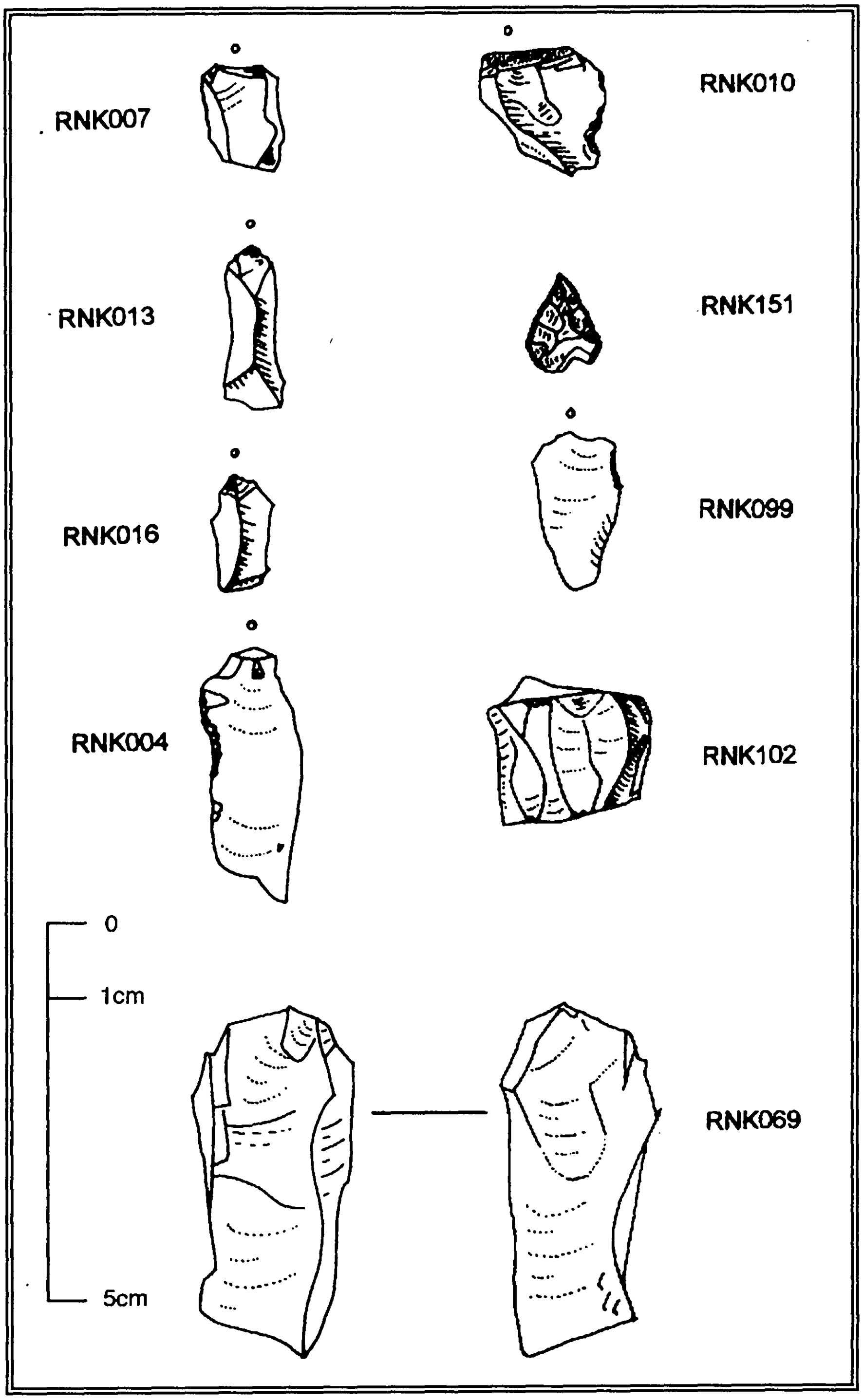
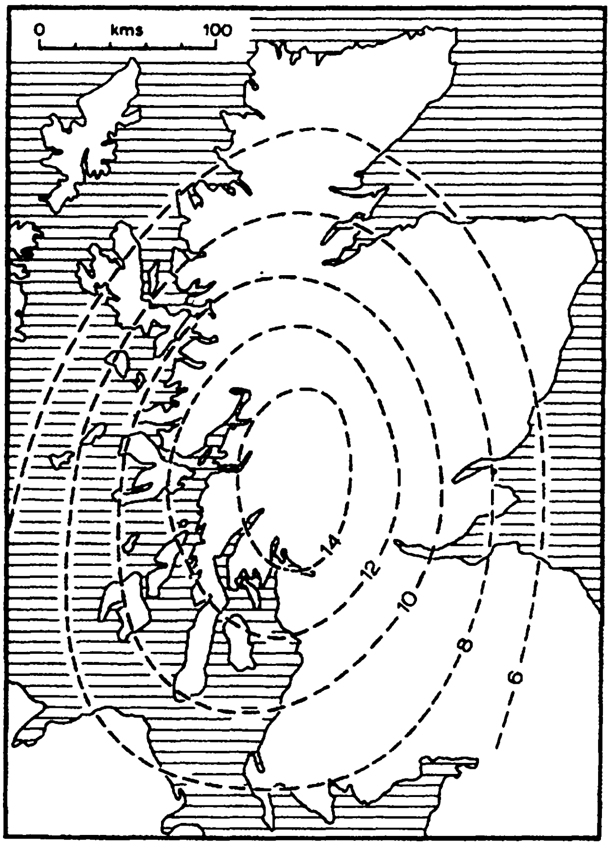


Figure 47: Rink Farm: Lithics from excavations



(Sissons 1967, Fig 9.6)
Isobases in metres OD

Figure 48: location of isobases

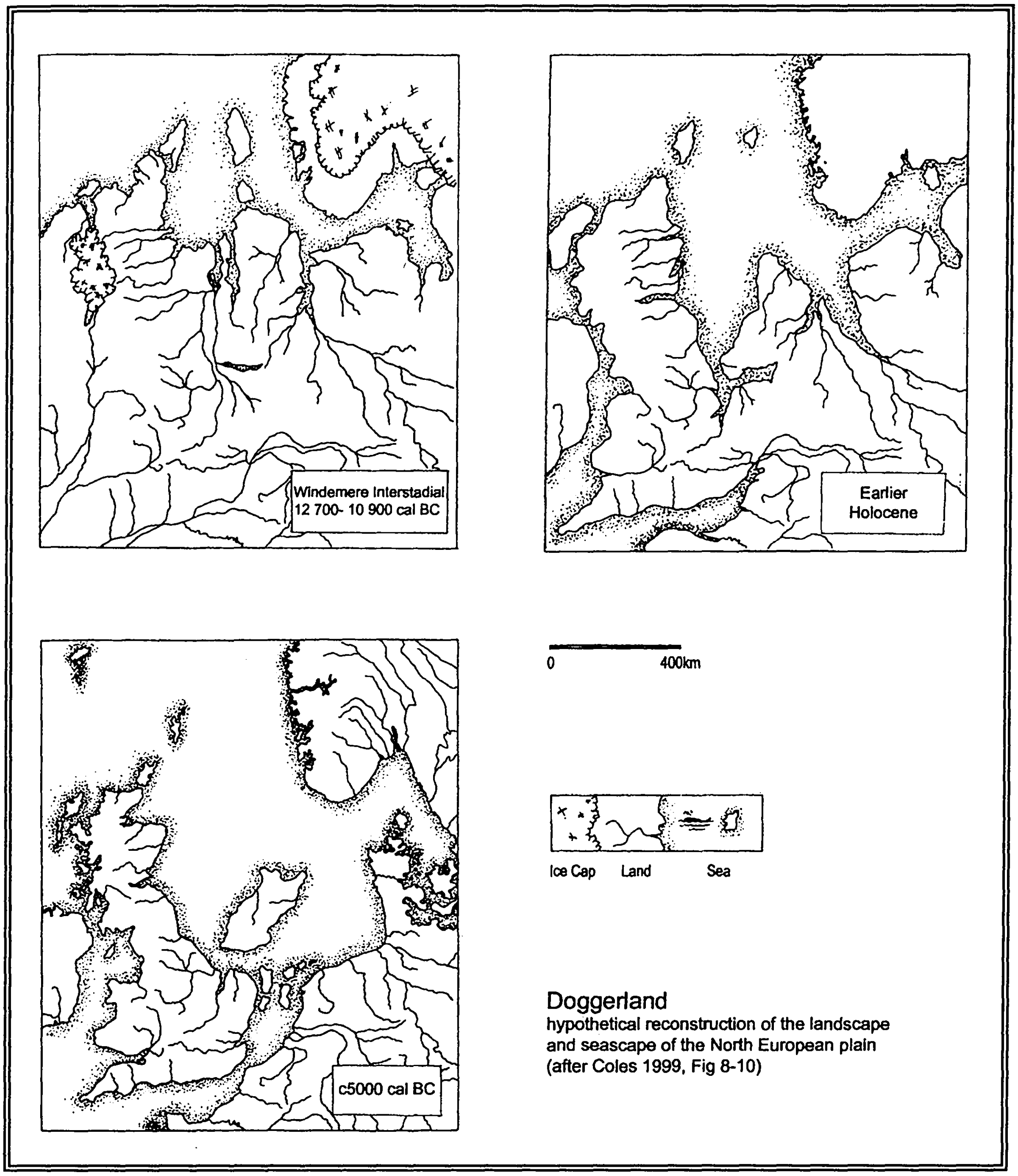


Figure 49: Doggerland

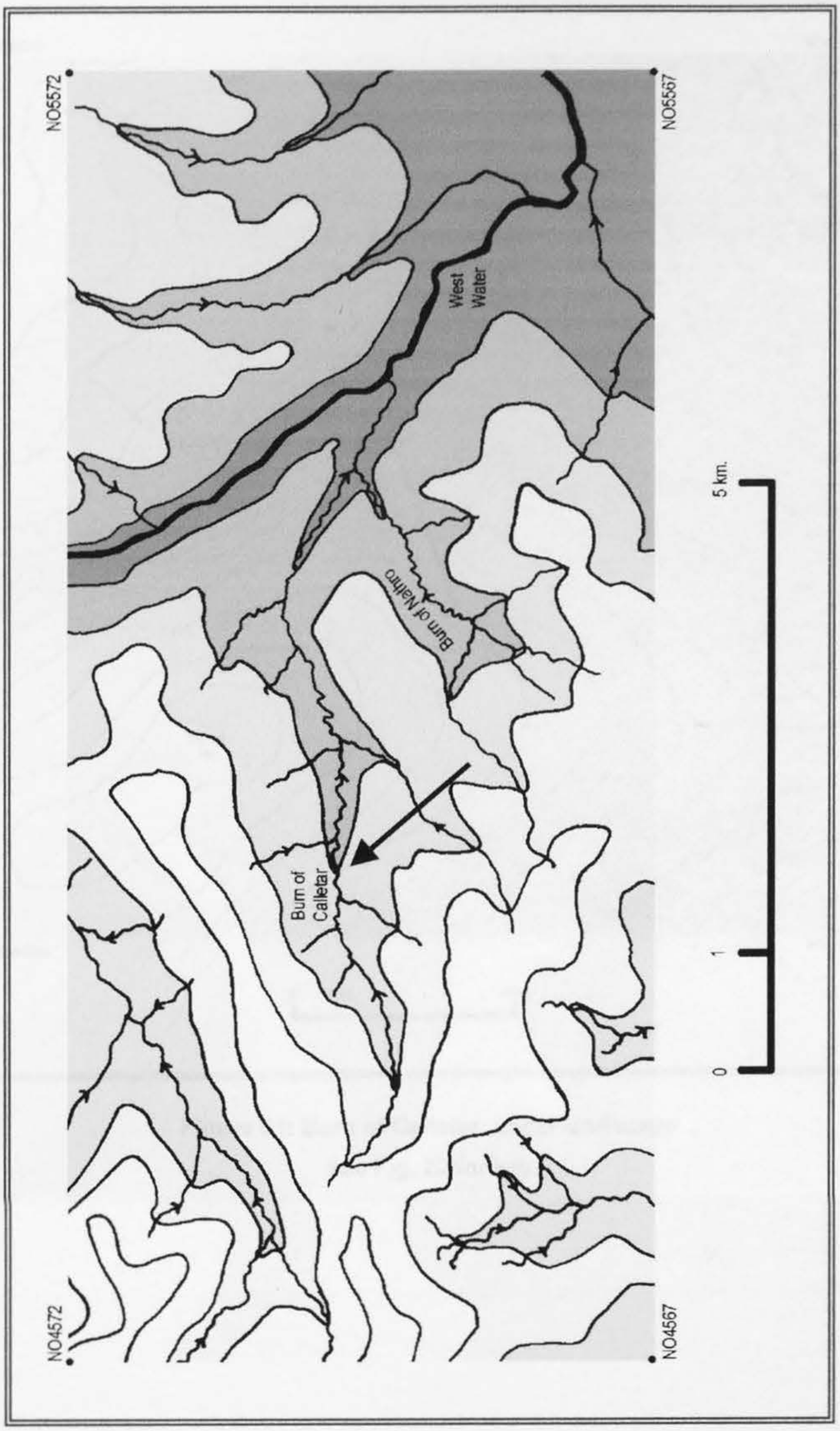


Figure 50: Burn of Calletar: regional landscape, arrow marks area of test pit survey (See Fig. 22 for key)

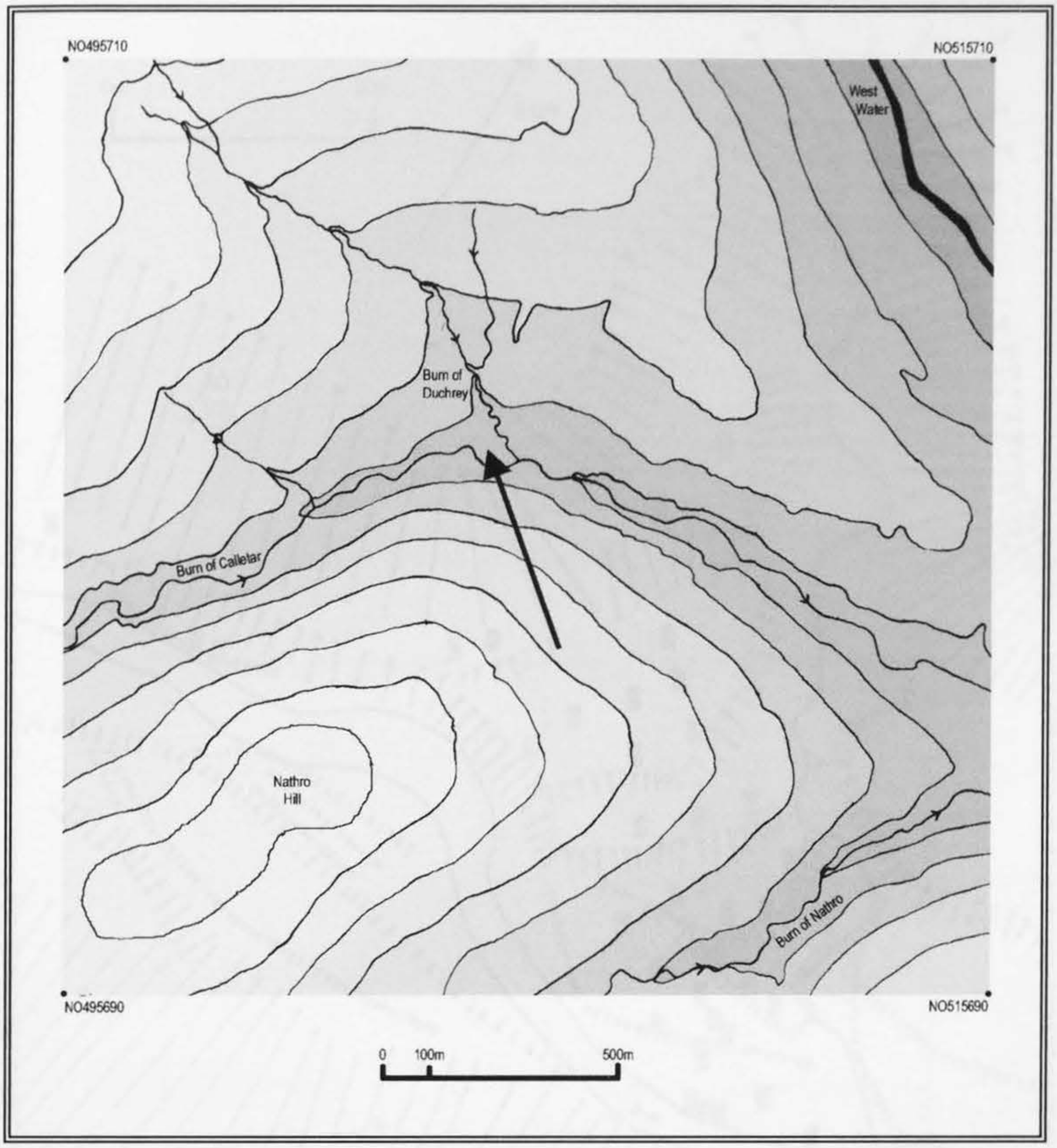


Figure 51: Burn of Calletar: Local landscape

See Fig. 22 for key

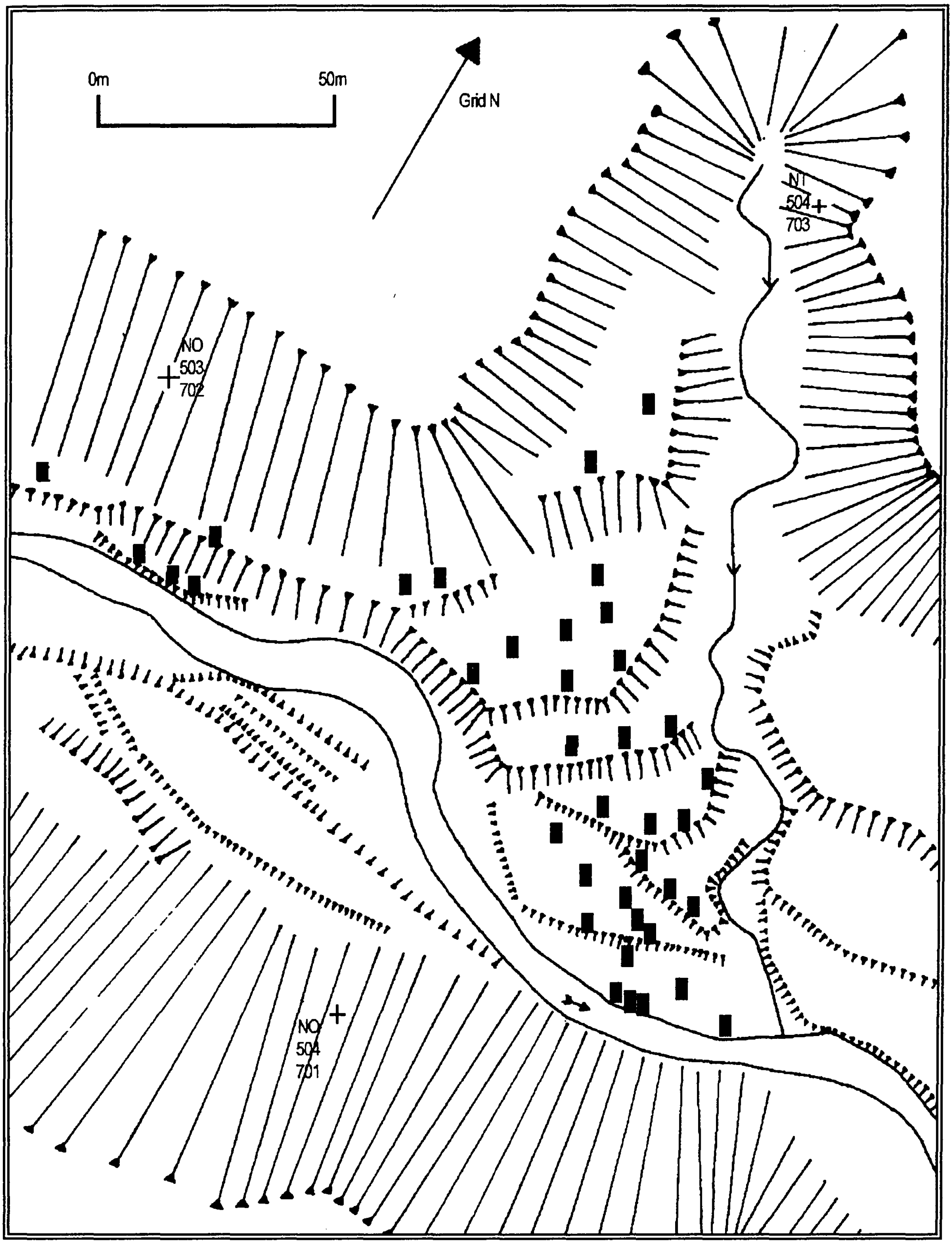


Figure 52: Burn of Calletar: location of testpits

Figure 53: Burn of Calletar: working shot, September 1999

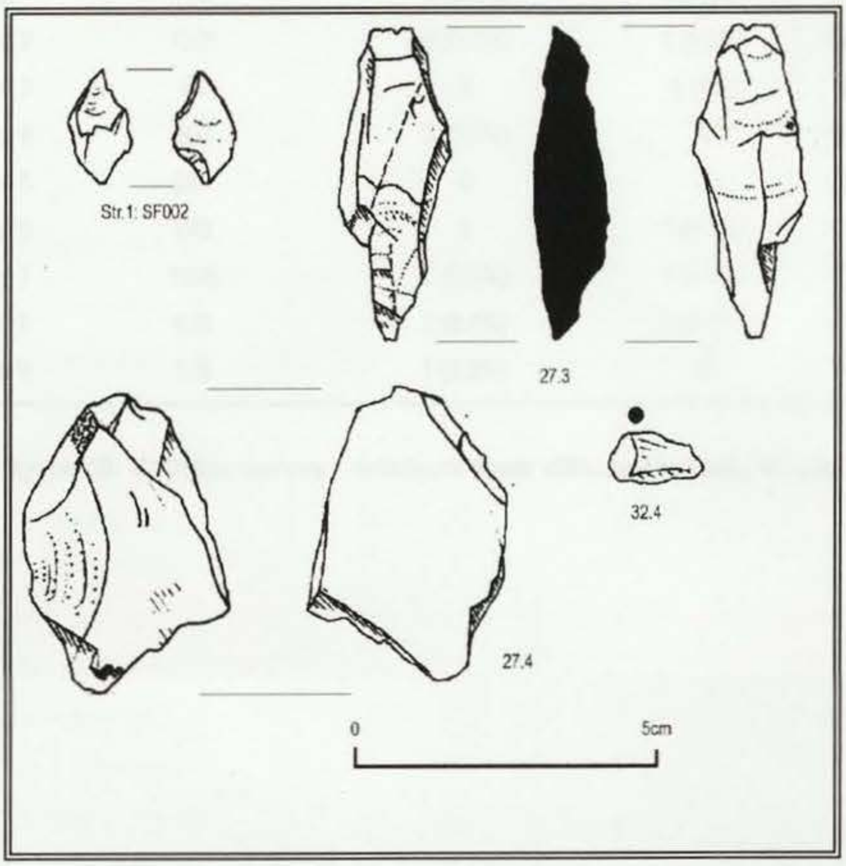


Figure 54: Burn of Calletar: lithics, all quartz

	possible		definite		
bipolar core	6	15.0%	3	25.0%	9
Chunk	17	42.5%	2	16.7%	19
flake irreg	6	15.0%	1	8.3%	7
flake reg	8	20.0%	5	41.7%	13
Cores	3	7.5%	1	8.3%	4
	40		12		

Figure 55: composition of quartz assemblage from Calletar

Terrace	Natural Quartz	Possibly Worked	Worked	Total
River	87	1 (1.1%)	1 (1.1%)	89
Level 1	735	6 (0.8%)	3 (0.4%)	744
Level 2	1301	9 (0.7%)	6 (0.5%)	1319
Level 3	94	0	1 (1%)	95
Level 4	600	3 (0.5%)	0	603
Level 5	284	0	0	284
Level 6	440	0	1 (0.2%)	441
Level 7	1038	7 (0.6%)	1 (0.1%)	1046
Level 8	428	2 (0.4%)	2 (0.4%)	432
Level 9	118	1 (0.8%)	0	119

Figure 56: Calletar survey - artefacts from different terrace levels

Site Name	Microliths	as % core tool	Scrapers	as % core tool	Burins	as % core tool	Axe/Adze	as % core tool	Denticulate	as % core tool	total of 'core tool types'	MicroBurin	per 100 microliths	Cores	Cores per 100 core tools	total	size	recovery	location	reference	notes
Morton A	226	27%	518	61%	101	12%	0	0%	0	0%	845	49	22%	280	33%	13500	small	excavation	coastal	Coles 1971	scraper number is small edge, large edge and end scrapers combined.
Springwood	25	35%	44	62%	2	3%	0	0%	0	0%	71	3	12%	96	135%	2278	unk	excavation	riverine	Wickham-Jones nd	redeposited material
Castle St, Inverness	16	52%	15	48%	0	0%	0	0%	0	0%	31	0	0%	10	32%	4754	unk	excavation	coastal	Wordsworth 1985	
The Green, Aberdeen	7	64%	2	18%	2	18%		0%		0%	11	4	57%	3	27%	297	small	excavation	coastal	Kenworthy 1982	
Fife Ness	34	77%	10	23%	0	0%	0	0%	0	0%	44	2	6%	9	20%	1518	small	excavation	coastal	Wickham-Jones & Dalland 1998	
Nethermills	170	79%	31	14%	14	7%	0	0%	0	0%	215	180	106%	52	24%	20000	large	excavation	riverine	Kenworthy 1981	number of cores reduced by collection?
Morton B	1		Sere-ral		present		0		0			0	0%	11			small	excavation	coastal	Coles 1971	roughly made burins and several small edge tools'
Queen St/Broad St, Aberdeen	1		2	50%	1	25%		0%		0%	4	2	200%	7	175%	101	sm	excavation	coastal	Kenworthy 1982	primary contexts only

Site Name	Microliths	as % core tool	Scrapers	as % core tool	Burins	as % core tool	Axe/Adze	as % core tool	Denticulate	as % core tool	total of 'core tool types'	MicroBurin	per 100 microliths	Cores	Cores per 100 core tools	total	size	recovery	location	reference	notes
Grieve H	2	11%	17	89%		0%		0%		0%	19	0	0%	33	174%	569	unk	surface	riverine	Kenney 1993	Grieve possibly over collects cores/scrapers
Grieve C	17	14%	101	86%		0%		0%		0%	118	2	12%	262	222%	4120	lg	surface	riverine	Kenney 1993	Grieve possibly over collects cores/scrapers
Grieve B	10	25%	30	75%		0%		0%		0%	40	1	10%	40	100%	861	lg	surface	riverine	Kenney 1993	Grieve possibly over collects cores/scrapers
Grieve A	19	36%	34	64%		0%		0%		0%	53	13	68%	159	300%	2247	lg	surface	riverine	Kenney 1993	Grieve possibly over collects cores/scrapers
Grieve J	2	100 %		0%		0%		0%		0%	2	2	100 %	26	1300 %	818	small	surface	riverine	Kenney 1993	Grieve possibly over collects cores/scrapers
Forvie (Hawke-Smith Collections)	32	28%	83	72%	0	0%	0	0%	0	0%	115	0	0%	249	217%	>250 0		surface - antiq	coastal	Hawke-Smith 1980	38 'notched pieces' and 33 'tools' are recorded
Fens	6	38%	8	50%	2	13%	0	0%	0	0%	16	0	0%	25	156%	227	unk	surface - antiq	riverine		2 double burins recorded. Also 2 possible burins, compare to Mulholland
Rink	50	56%	32	36%	0	0%	0	0%	7	8%	89	0	0%	0	0%	>150 00	large	surface - antiq	riverine	Haley 1990	denitculates/serrated recorded together
Menie (HawkeSmith Collection)	44	71%	18	29%	0	0%	0	0%	0	0%	62	0	0%	55	89%	>150 0		surface - antiq	coastal	Hawke-Smith 1980	4 'notched pieces' and 23 'tools' are recorded

Site Name	Microliths	as % core tool	Scrapers	as % core tool	Burins	as % core tool	Axe/Adze	as % core tool	Denticulate	as % core tool	total of 'core tool types'	MicroBurin	per 100 microliths	Cores	Cores per 100 core tools	total	size	recovery	location	reference	notes
Little Gight	9	19%	39	81%	0	0%	0	0%	0	0%	48	0	0%	31	65%		unk	surface - excav		Baird & Finlayson 1994	mixed assemblage
Kalemouth 1	4	24%	11	65%	2	12%		0%		0%	17	0	0%	4	24%	108	lg	surface?	riverine		sample of larger site
Kalemouth 2	3	23%	10	77%	0	0%	0	0%	0	0%	13	0	0%	8	62%	142	lg	surface?	riverine		sample of larger site
Dookits	4	36%	6	55%	1	9%		0%		0%	11	2	50%	6	55%	150	small	surface - excav	riverine		
Cornhill Farm	21	49%	22	51%	0	0%	0	0%	0	0%	43	1	5%	782	1819 %	5117	lg	surface - excav	riverine	Gleeson 1999	production site
Manor Bridge	26	53%	22	45%		0%		0%	1	2%	49	4	15%	62	127%	916	lg	surface - excav	riverine		diffuse scatter with localised concentrations, number of scrapers includes many irregular pieces
Netherkirkgate, Aberdeen	2	29%	5	71%		0%		0%		0%	7	2	100 %	0	0%	207	unk	unk	coastal	Kenney 1993	

Figure 57: composition of assemblages

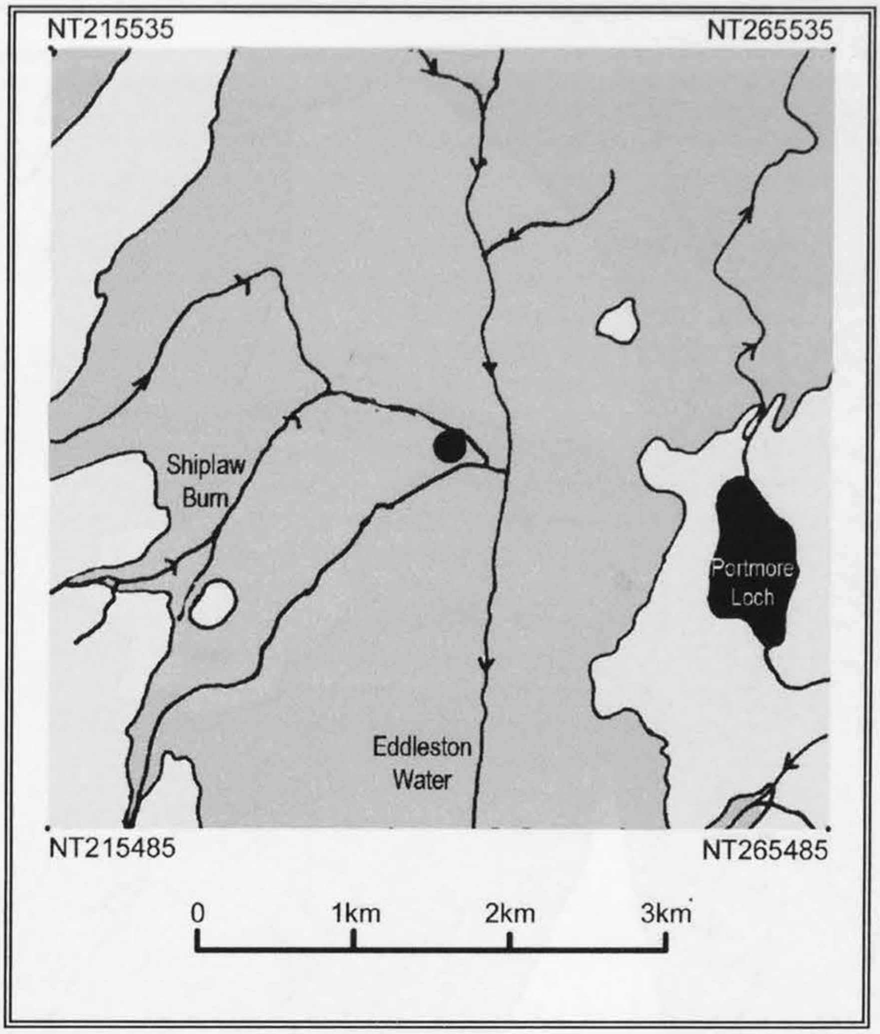


Figure 58: Shiplaw: regional landscape (for key see Fig. 22)

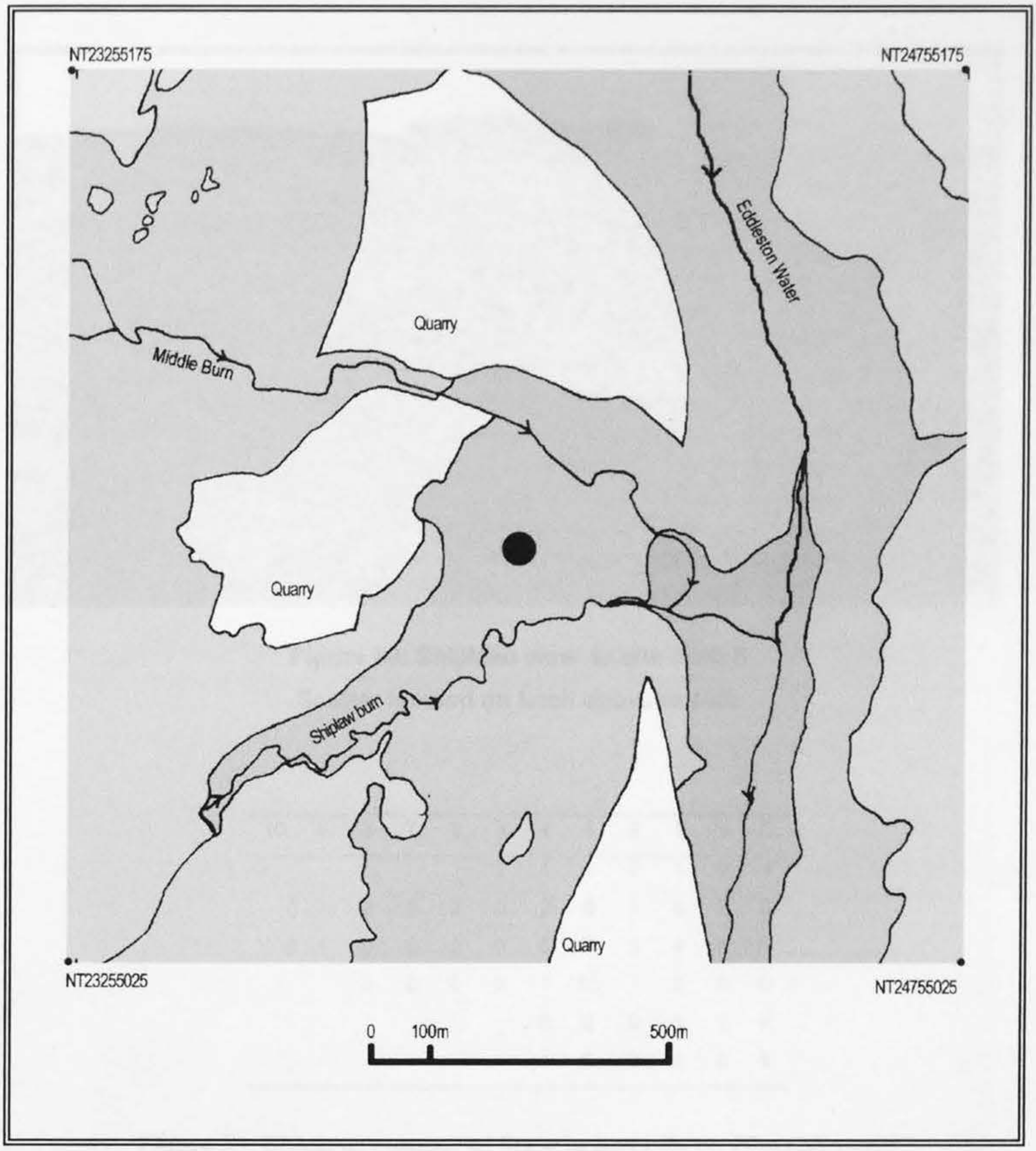


Figure 59: Shiplaw: local landscape (for Key see Fig. 22)

Figure 60: Shiplaw: view to site from S

Scatter located on knoll above terrace

10	9	8	7	6	5	4	3	2	1	0	ID
					2	1	1	0	1	0	I
0	1	2	2	2	8	2	0	1	9	2	G
0	1	0	0	3	0	6	0	5	4	0	E
		0	0	0	0	1	53	1	0	0	C
						0	0	0	5	2	A
							0	0	1	0	Y

Figure 61: Shiplaw: number of finds in test pits on 20mx20m grid

90	80	75	70	65	60	50	
6			**0**			**5**	E
	0	**3**	**0**	**3**	**1**		D
	1	**0**	**0**	**1**	**1**		CD
1	**10**	**-**	**53**	**8**	**1**	**1**	C
	5	**-**	**7**	**6**	**3**		BC

Figure 62: Shiplaw: number of finds in test pits on 5mx5m grid near scatter

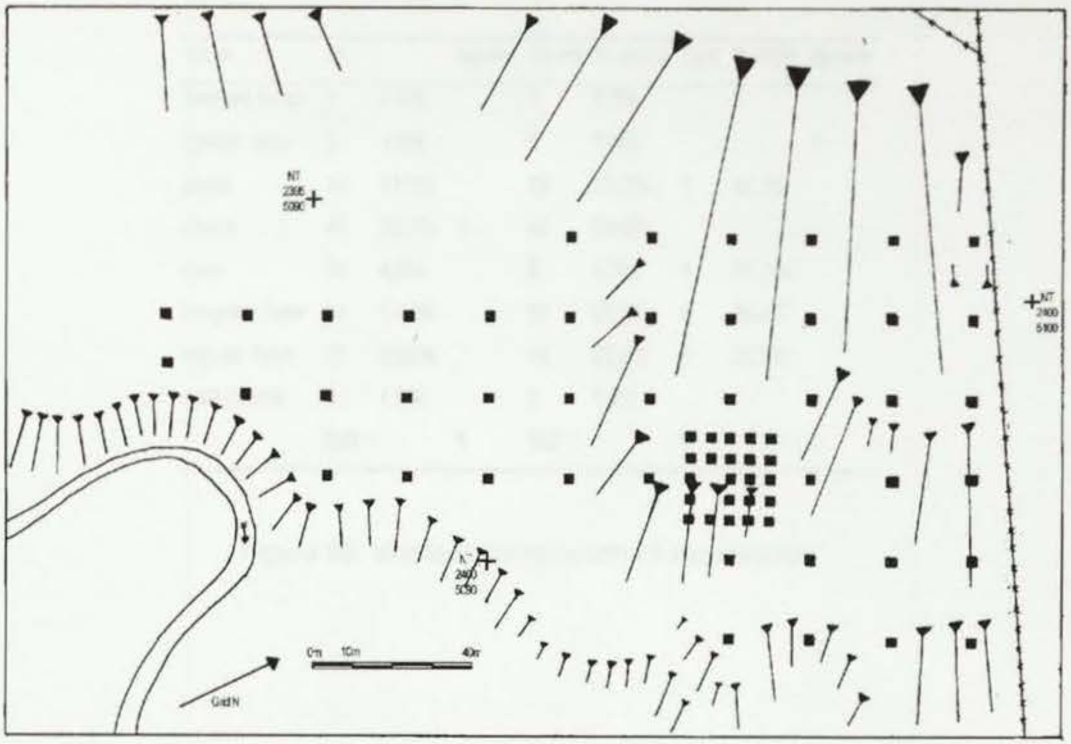


Figure 63: Shiplaw: location of test pits

Figure 64: Shiplaw: subsoil, Pit A2

Main scale 20cm divisions, minor scale 5cm divisions

blank	N		agate	Chert	% chert	flint	% flint	quartz
bashed lump	1	0.5%		1	0.5%			
bipolar core	3	1.5%		2	1.0%			1
blade	35	17.2%		34	17.7%	1	11.1%	
chunk	41	20.2%	1	40	20.8%			
core	10	4.9%		9	4.7%	1	11.1%	
irregular flake	64	31.5%		60	31.3%	4	44.4%	
regular flake	47	23.2%		44	22.9%	3	33.3%	
split pebble	2	1.0%		2	1.0%			
	203		1	192		9		1

Figure 65: Shiplaw: composition of assemblage

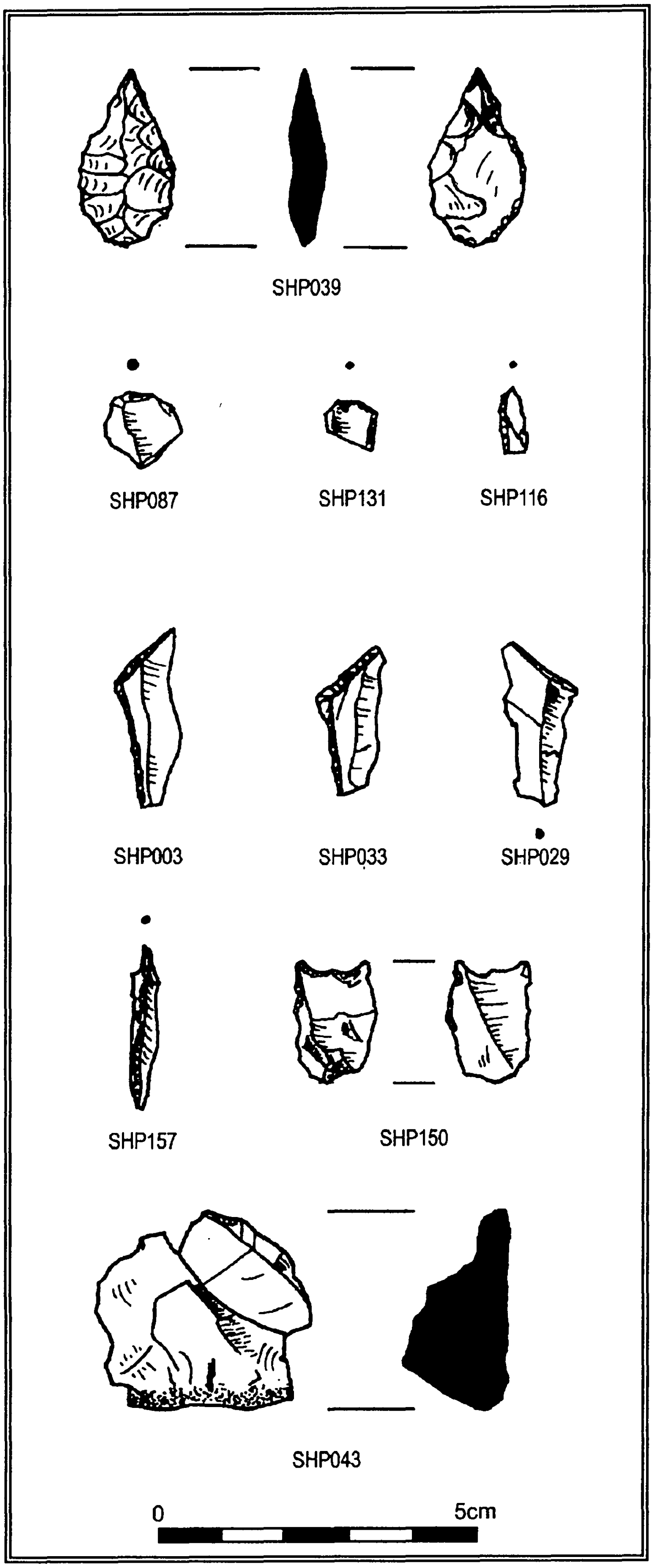


Figure 66: Shiplaw: lithics

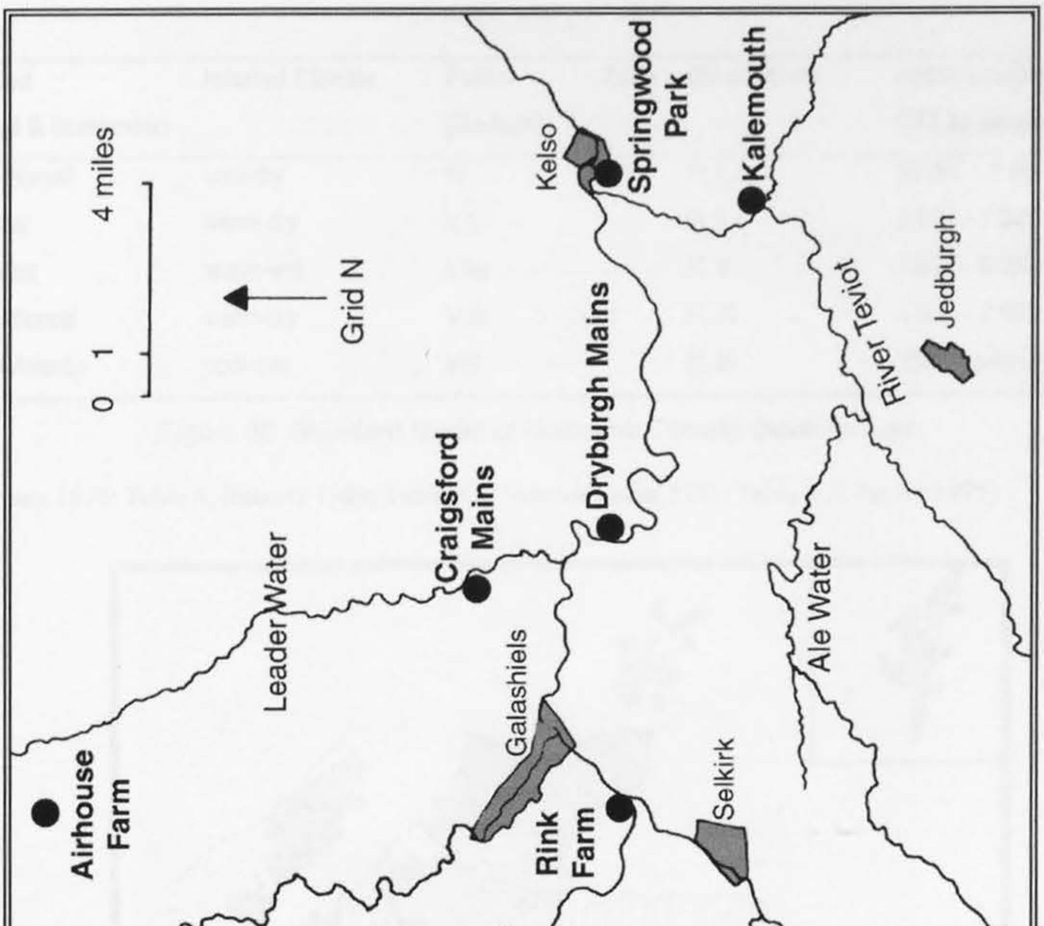


Figure 67: Tweed Valley: location of main sites

Period (Blytt & Sernander)	Inferred Climate	Pollen Zone (Godwin)	Chronozone	Approximate age C14 bp uncal.
Pre-Boreal	cool-dry	IV	Fl. I	10 000 – 9 500
Boreal	warm-dry	V-VI	Fl. I	9 500 – 7 000
Atlantic	warm-wet	VIIa	Fl. II	7 000 – 5 000
Sub-Boreal	warm-dry	VIIb	Fl. III	5 000 – 2 500
Sub-Atlantic	cool-wet	VIII	Fl. III	2500 – present

Figure 68: Standard Model of Holocene Climatic Development

(Evans 1974: Table 4, Roberts 1989: Table 4.2, Simmons *et al* 1981: Table 3.2, Taylor 1975)

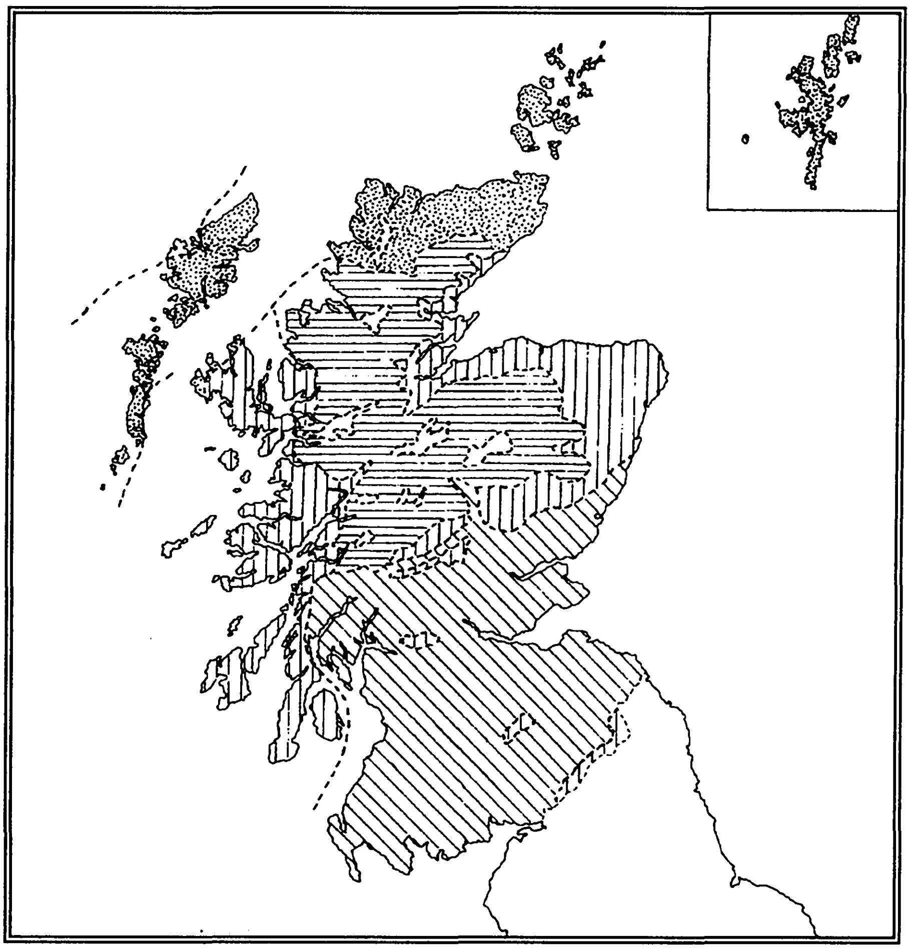


Figure 69: Reconstruction of vegetation types in Scotland c3000BC (Tipping 1994)

Blank: unwooded areas; horizontal lines: pine, pine/birch; vertical lines: birch/hazel/oak; diagonal lines: oak/hazel/elm

Figure 70: 64lb rod caught salmon from the Tay

Caught by Miss GW Ballantine 7/10/22

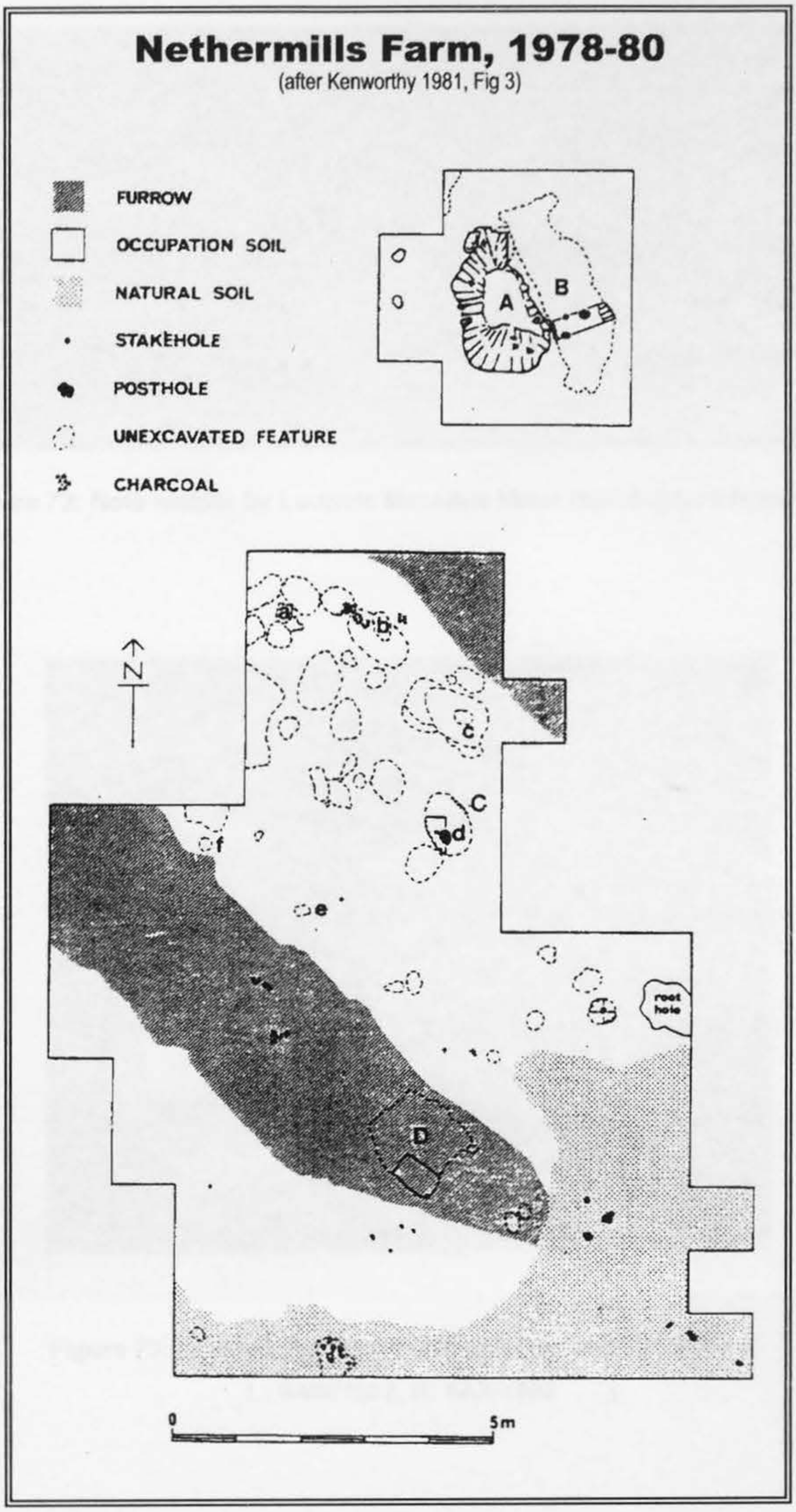


Figure 71: Nethermills Plan

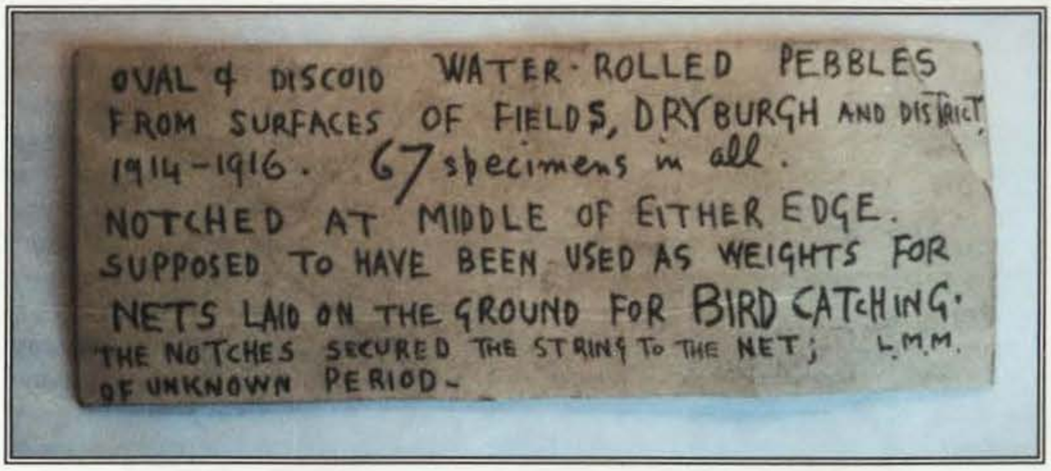


Figure 72: Note written by Ludovic Macellan Mann (Kelvingrove Museum)

Figure 73: Waisted Pebbles: Perth Museum and Art Gallery

L: 6AW/1962, R: 6AX/1962

Figure 74: Waisted Pebbles: Rink (Elliot Collection)

L-R: RNK3, RNK1, RNK2

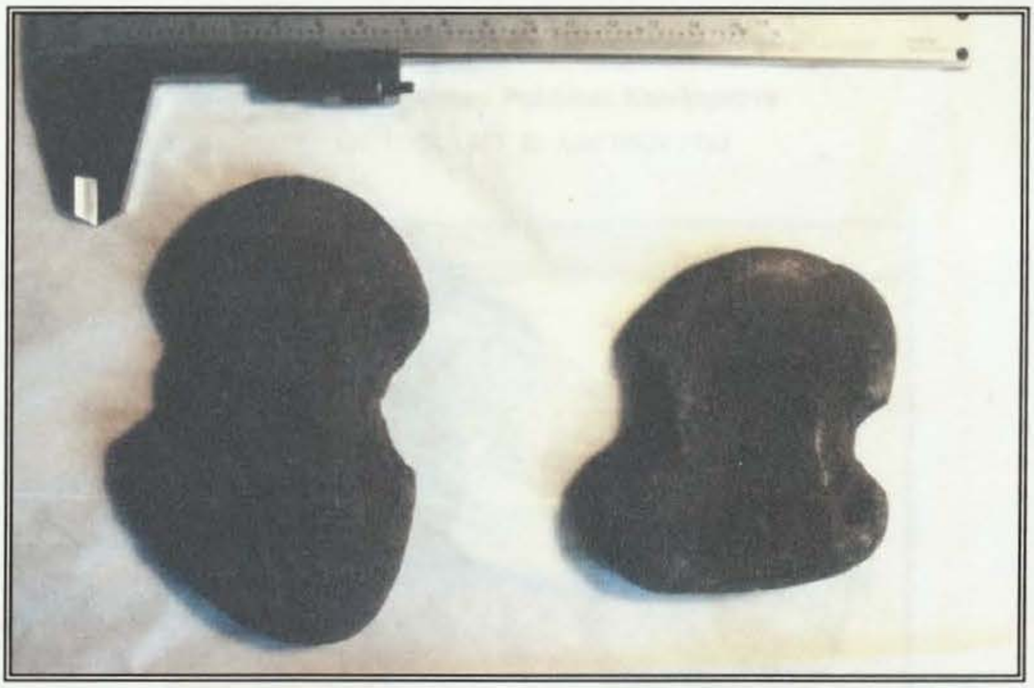


Figure 75: Waisted Pebbles: Kelvingrove Museum

L: ARCHNN 1782a, R: ARCHNN 1782b

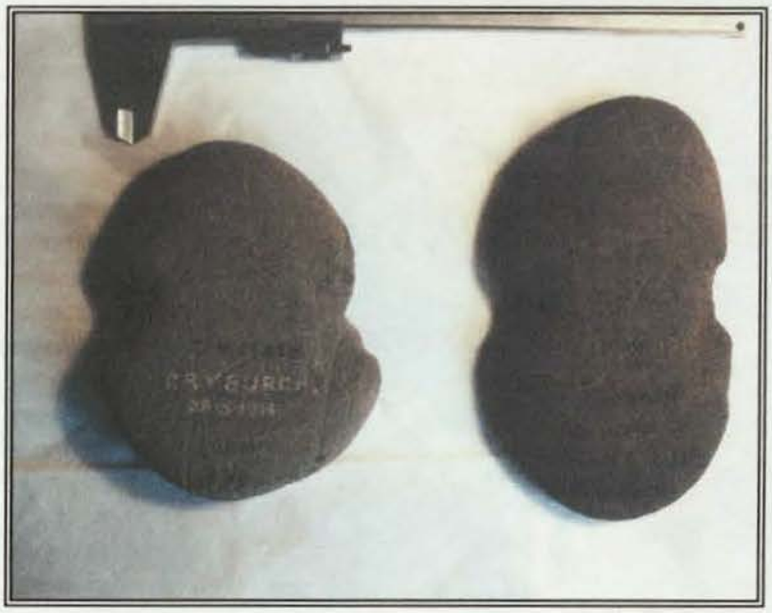


Figure 76: Waisted Pebbles: Kelvingrove
L: ARCHNN 1783, R: ARCHNN 1784

Figure 77: Waisted Pebbles: Kelvingrove
L: ARCHNN 1785, R: ARCHNN 1786

Figure 78: Waisted Pebbles: Selkirk

L-R: Selkirk A, 2613, 2611

Figure 79: Waisted Pebbles: Selkirk

L-R: Selkirk C, B, D

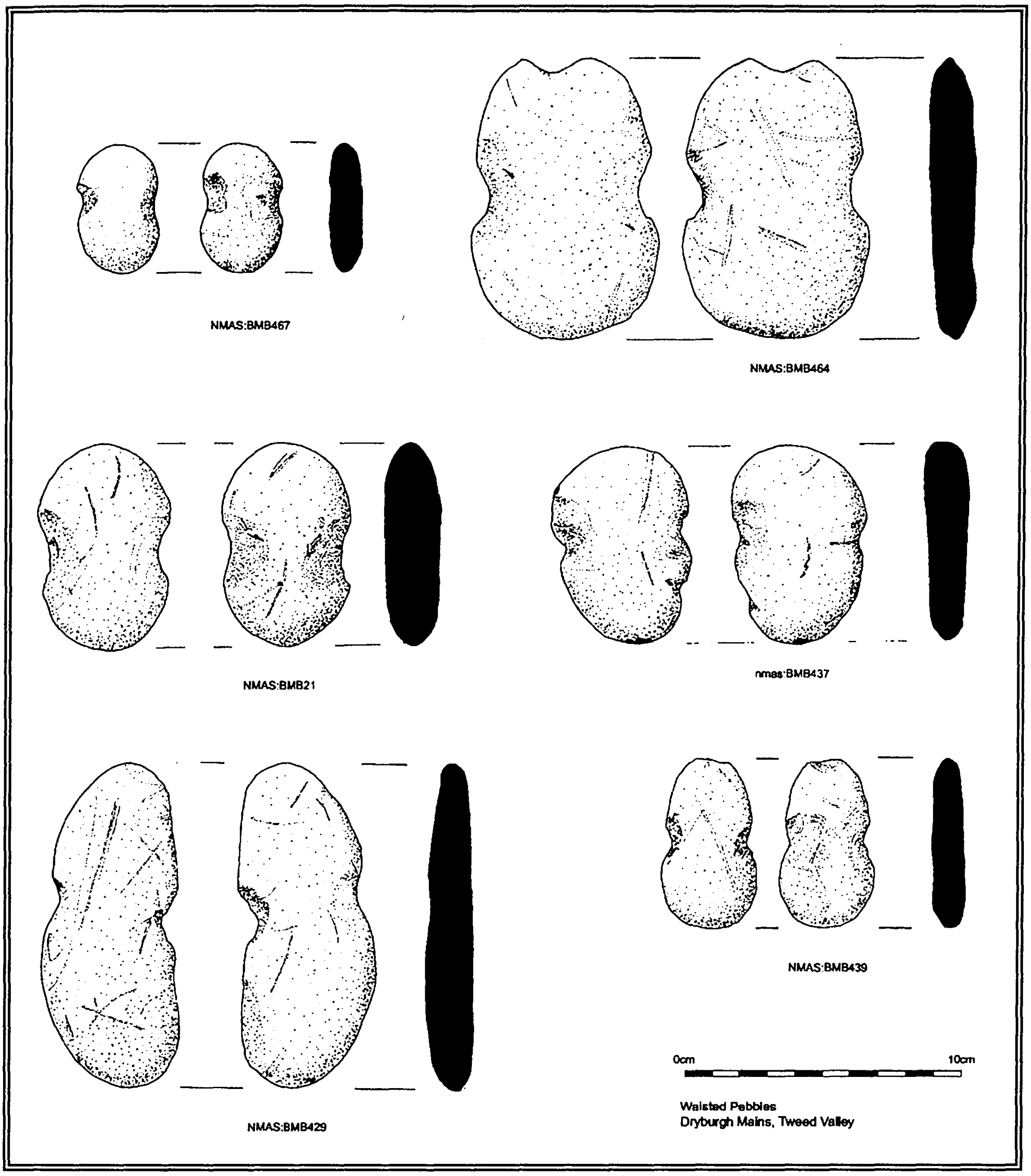


Figure 80: Waisted Pebbles: NMAS

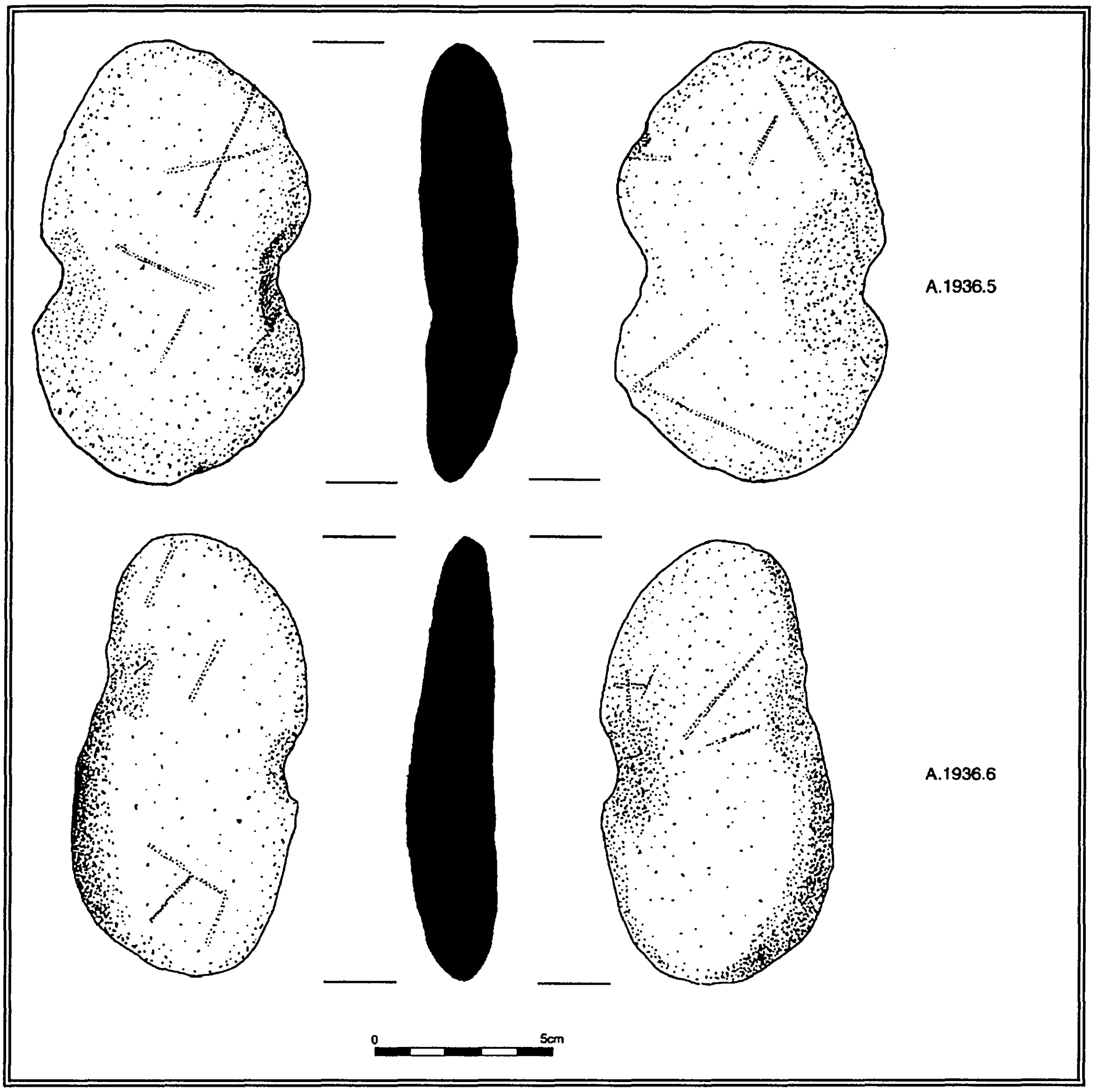


Figure 81: Waisted Pebbles: Hunterian Museum

All sites n=110	Avg	Min	Max	IQR 1	IQR 3
Length (mm)	94.0±21	27	156	82	104
Breadth (mm)	61.3±13.8	20	111	53.25	70.75
Depth (mm)	18.2±5.3	3	34	14	21
Weight (g)	164.7±94.3	3	673	109.25	204.5
Bemersyde n=15					
Length	95.9±14.4	61	113	87.5	104.5
Breadth	66.1±12.9	35	85	58.5	74
Depth	17.3±4.4	8	24	14	21
Weight	171.2±60.3	40	263	131.5	224.5
Dryburgh n=36					
Length	95.1±28.2	27	156	80.5	108.25
Breadth	60.8±17.8	20	111	50.5	70.5
Depth	18±5.7	3	32	14	20
Weight	178±131.8	3	673	100.25	225.5
Park n=5					
Length	89.6±13.2	76	111	83	91
Breadth	59.6±10.7	45	74	55	64
Depth	20.8±3.0	19	26	19	21
Weight	145.8±51.8	112	236	114	142
Rink n=11					
Length	94.3±13.4	80	121	82	107.5
Breadth	54.3±5.8	48	65	51	55
Depth	16.2±2.93	13	23	14.25	17
Weight	132.3±42.2	82	205	100	166.5
Unknown (Dryburgh?) n=27					
Length	93.3±15.7	58	119	83	104
Breadth	62.4±11	39	80	54.5	71.5
Depth	18.7±5.6	9	34	14.5	22
Weight	161.6±76.1	42	324	103.5	194
Unknown n=6					
Length	97.3±8.3	85	111	96	98
Breadth	68.8±6.7	58	76	65.75	74
Depth	19.8±4.6	16	29	18	19
Weight	171.2±45.2	135	259	144.75	169.5

Figure 82: Waisted Pebbles: average sizes

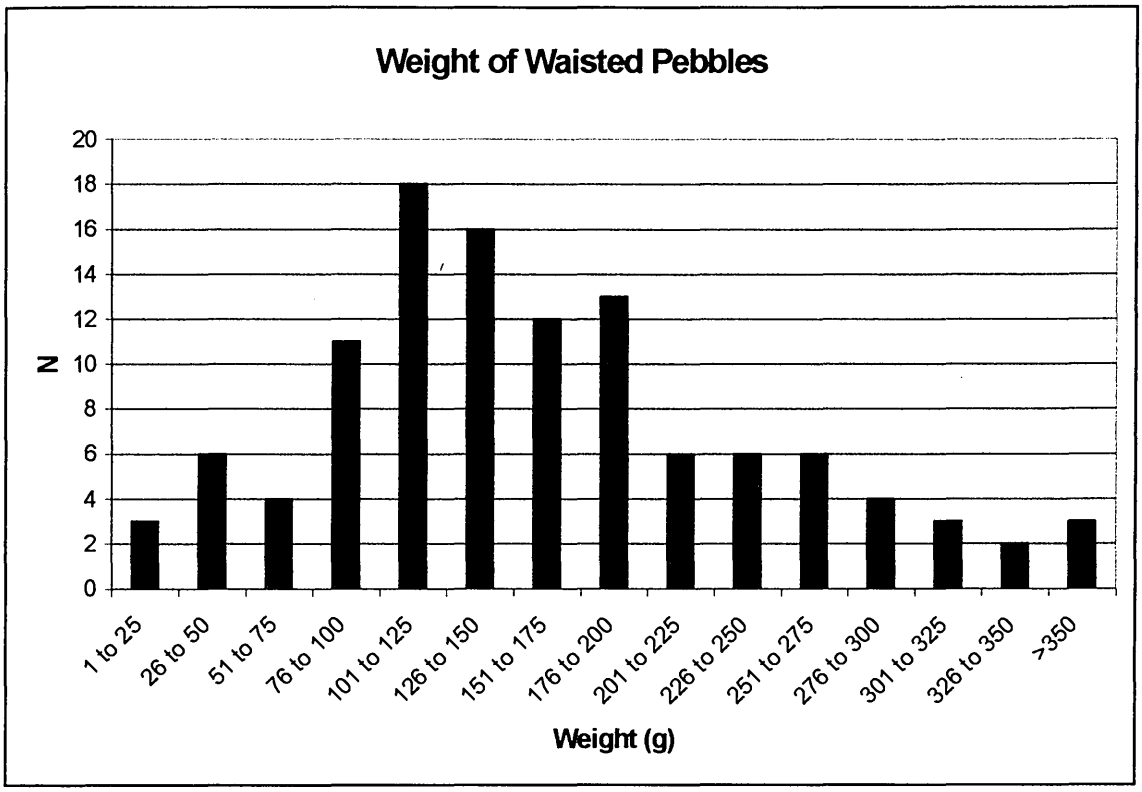


Figure 83: Waisted pebbles weight

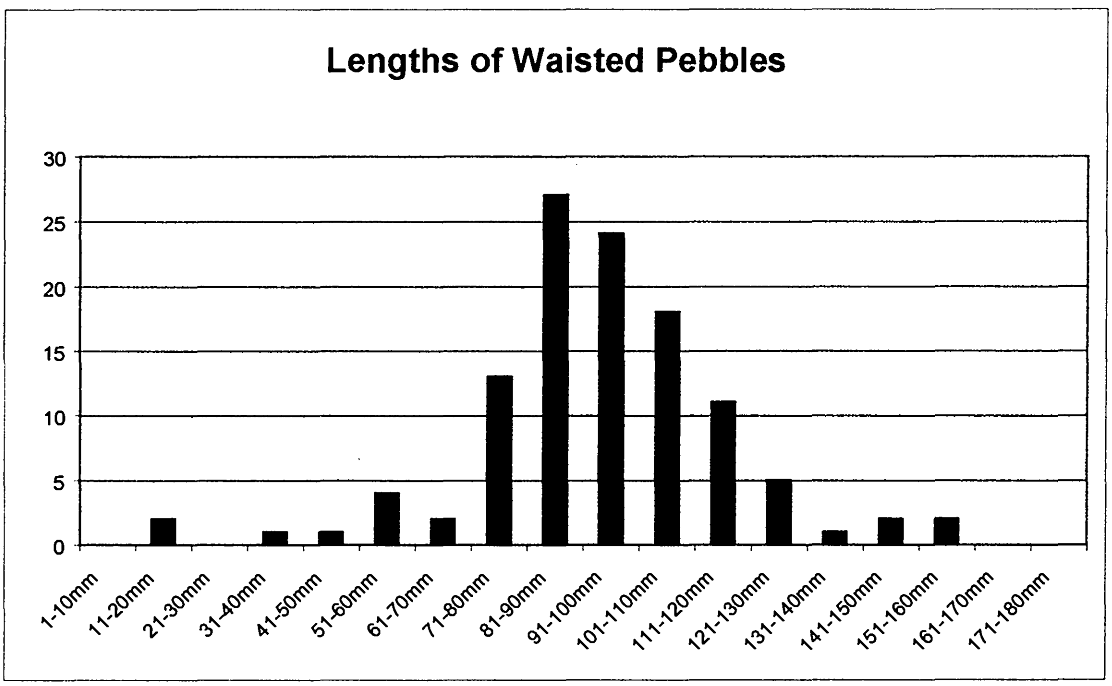


Figure 84: Waisted pebbles: length

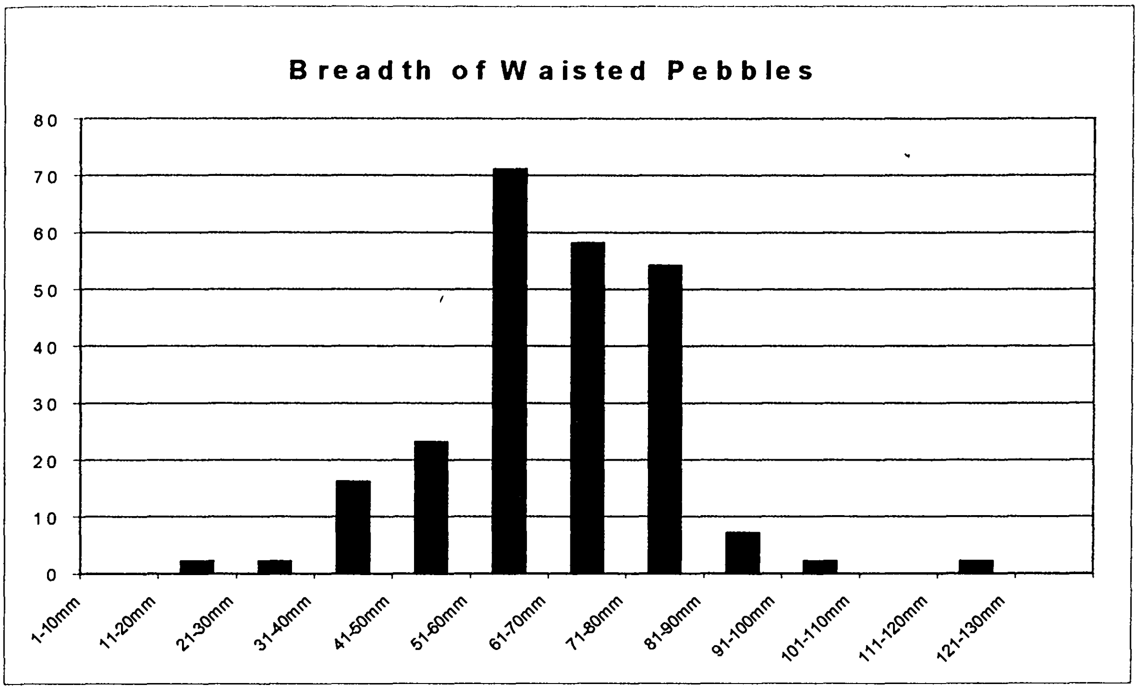


Figure 85: Waisted Pebbles: breadth

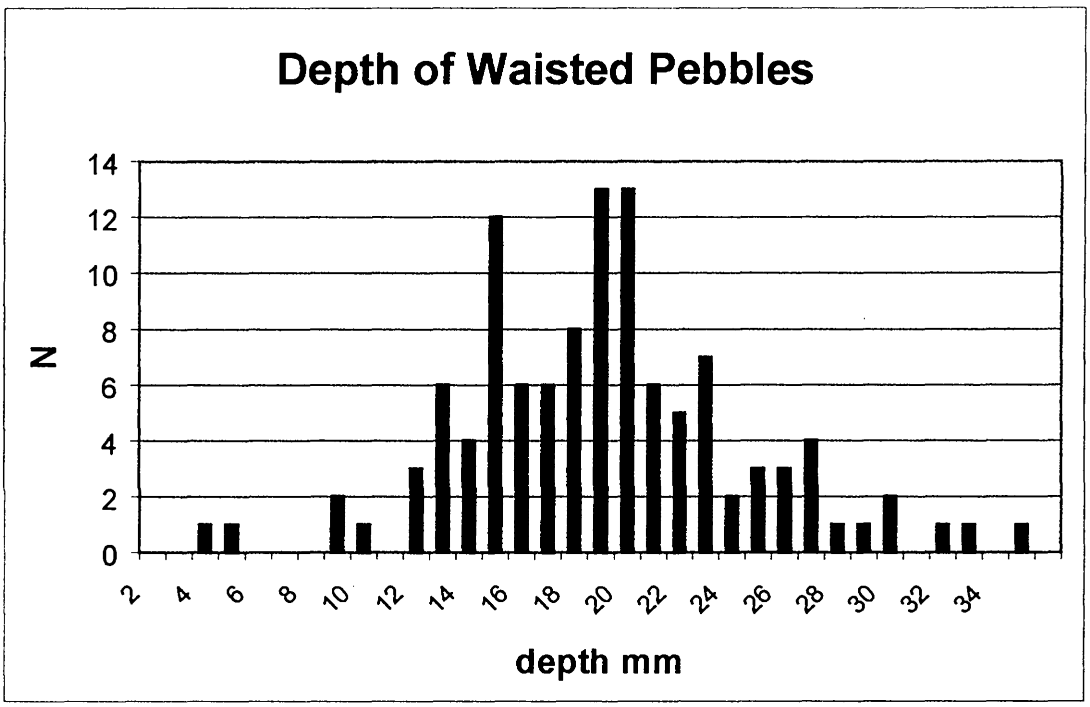


Figure 86: Waisted Pebbles: depth

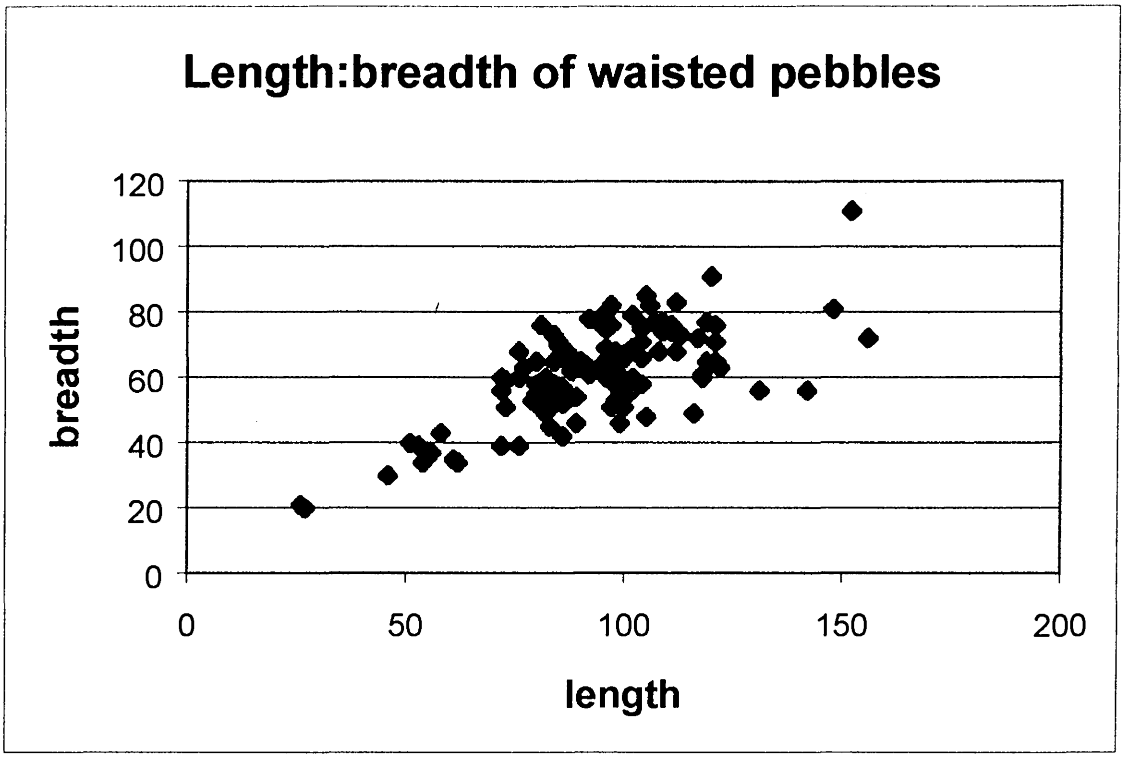


Figure 87: Waisted Pebbles: length:breadth ratio

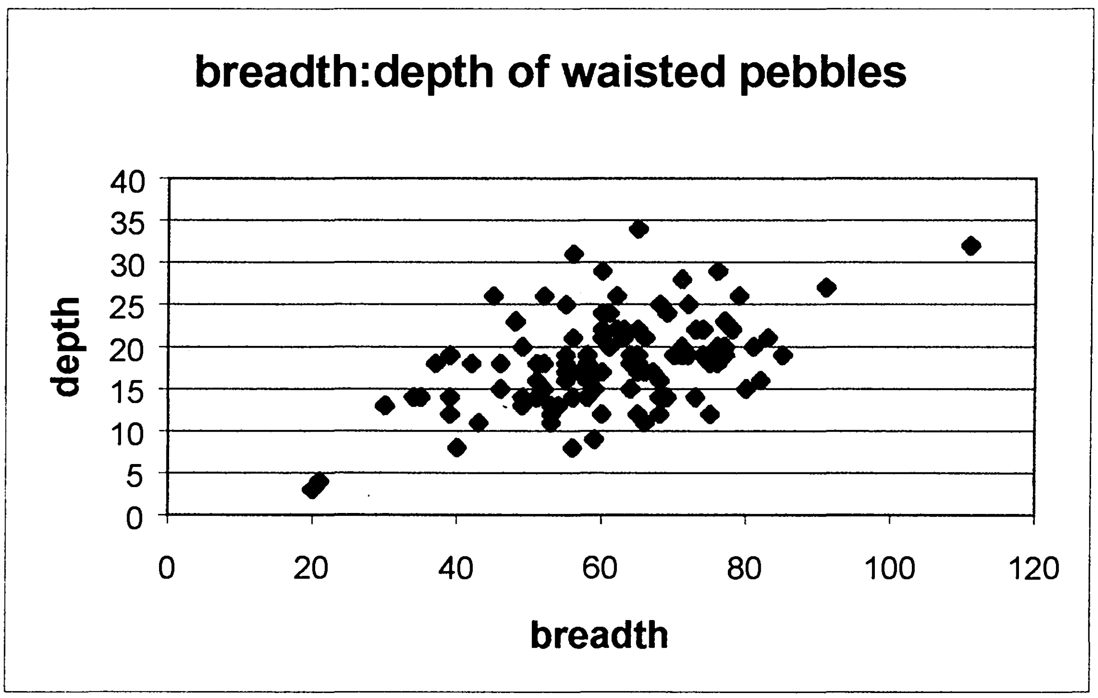


Figure 88: Waisted Pebble: breadth:depth ratio

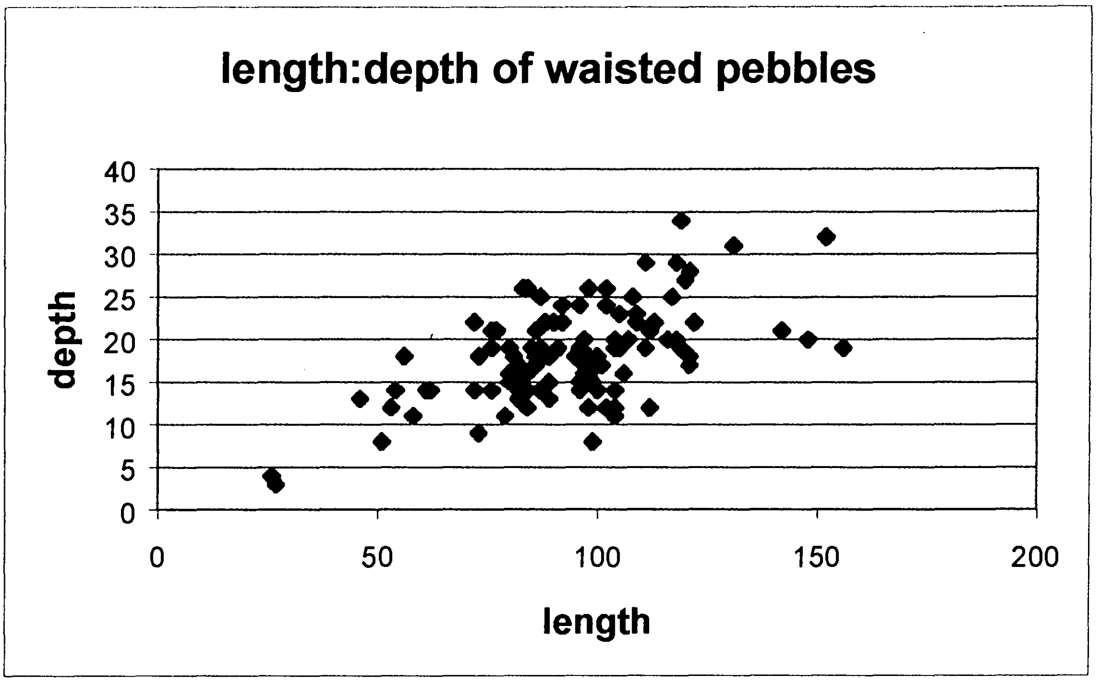


Figure 89: Waisted Pebbles: length:depth ratio

No notches	Avg L	Avg Br	Avg Depth	Avg Weight
1 (n=1)	62	34	14	48
2 (n=100)	92.5±20.8	60.5±13.6	18±5.4	158.1±81.2
3 (n=5)	111±27.2	75.2±22.5	21.8±8.3	289±230.4
4 (n=1)	156.0	72	19	326
Indet (n=6)				

Figure 90: waisted pebbles: size by numbers of notches

Site	1	2	3	4	Indet	N
Bemersyde		14			1	15
Blakelaw		1				1
Craigsfordmains		1				1
Dryburgh	1	33	3	1	3	41
Fairnington		2				2
Faldonside		1				1
Newstead		1				1
Park, Earlston		5				5
Rink		9			1	10
Rutherford		3				3
Unknown		5	1			6
Unknown (Dryburgh?)		25	1		1	27

Figure 91:Waisted Pebbles: no of notches by site

'collector'	1	2	3	4	indet	N
?Tom Scott		6				6
CJ Brown		22			3	25
Corrie	1	3	1	1		6
Corrie/Mann		5				5
Cruickshank		2			1	3
Curle		2				2
Elliot		4				4
James Roberts		2				2
Lamb/Stewart		11	2			13
Mann(?Corrie)		1				1
Mason		6				6
Mason?		1				1
Mulholland					1	1
Munro		27	1		1	29
Unk		4				4
unk (Mason/Elliot?)		4	1			5

Figure 92: Waisted Pebbles: no of notches by collector

Site		Analysed Artefacts	Unanalysed	meso	later	Ref	Notes
Bemersyde	NT605335	15				Corrie 1914	
Blakelaw	NT7731	1		(Y?)	Y		
Craigsfordmains	NT5738	1		Y	y		
Dryburgh	NT5932	41		Y	(y)*	Corrie 1914	Orchard Field, Monksford Field (NT58713248), East Field
Dryden Farm	NT468247		1 or 2 now lost	n	y	Elliot pers comm (from Bruce Mason)	'A mainly neolithic/bronze age site'
Fairnington	NT6427	2		y	y	Corrie 1914	
Faldonside	NT5032	1		Y?			microliths from 'Falside' are held in Perth Museum (Roberts coll^{n}), presumably the same site
Kalemouth	NT7125			y	y	Elliot pers comm	
Newstead	NT575345	1		y		Corrie 1914	
Park, Earlston	NT5936	5		Y?	Y		
Philiphaugh Farm	NT456286		at least one	y	y	Elliot pers comm (from Bruce Mason)	
Rink	NT4832	10	21	Y	(y)		Upper and lower fields
Rutherford	NT6430	3		Y			
Smedheugh Farm	NT494281		2 or 3, now lost	Y		Elliot pers comm (from Bruce Mason)	
Springwood	NT7233		unk	Y	(y)	Elliot pers comm	
St Boswells Haugh	?		unk			Corrie 1914	
Whitrig Bog	NT613340		unk	Y?		Corrie 1914	microliths are known from Whitrighill, possibly part of the same site
Unknown		6	1				one unprovenanced artefact in Lillie collections: poss Springwood? Elliot pers comm
Unknown (Dryburgh)		27					
		113					

Figure 93: Waisted pebbles: findspots and associations

***(y) – later artefacts but assemblage dominated by mesolithic material**

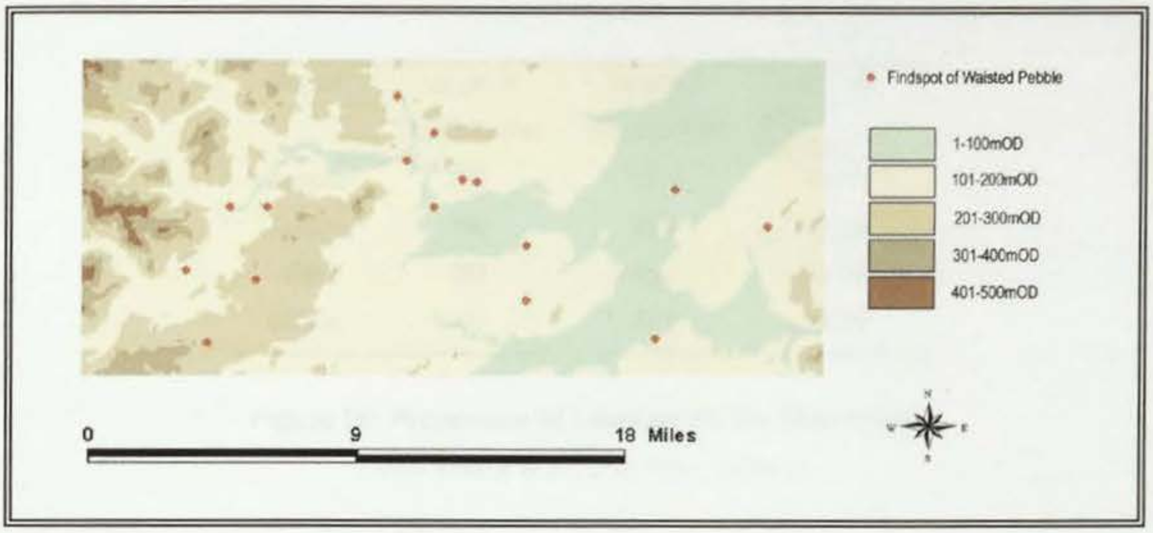


Figure 94: Waisted Pebbles: distribution of finds

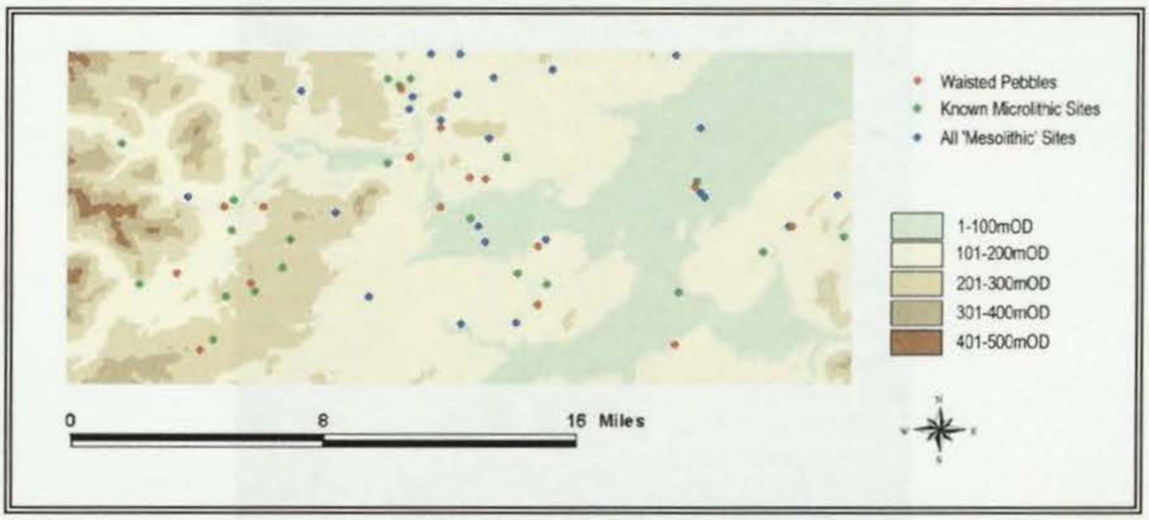


Figure 95: Waisted pebbles: distribution and mesolithic sites

Region	Length of Coastline (km)	Length of Beaches (km)	Coastline with beaches.
Grampian	369	107.4	29.1%
Tayside	130	23.6	18.2%
Fife	201	43.2	21.5%
Lothian	121	37.3	30.8%

Figure 96: Proportion of beaches on the East coast

(After Ritchie & Mathers 1984, Table 1)

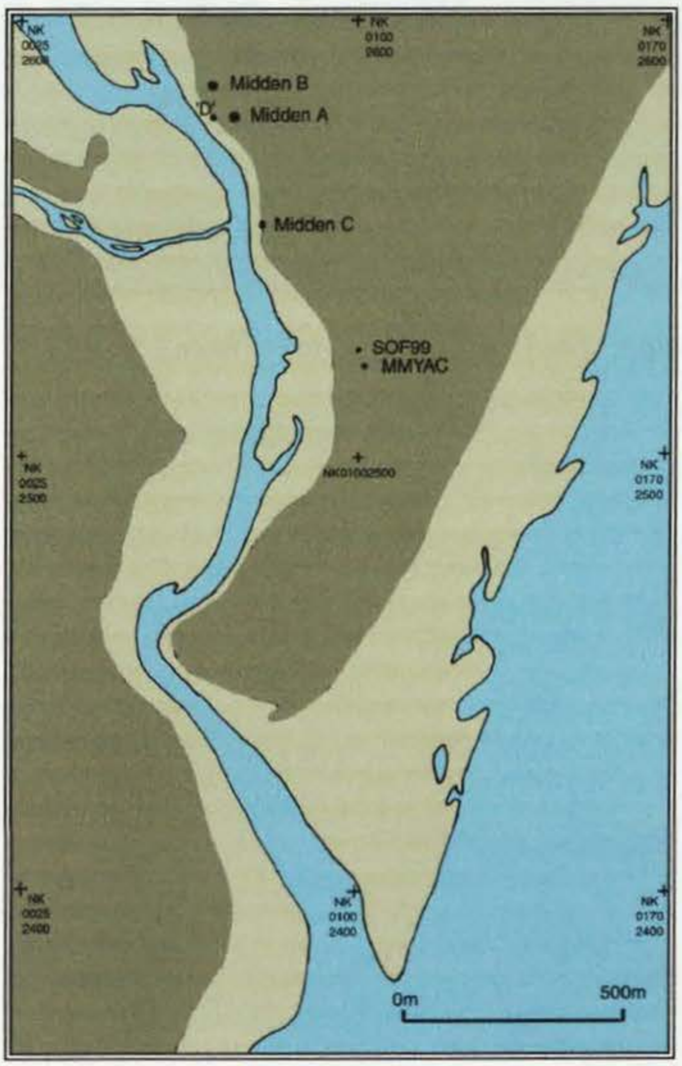


Figure 97: Sands of Forvie: location of sites

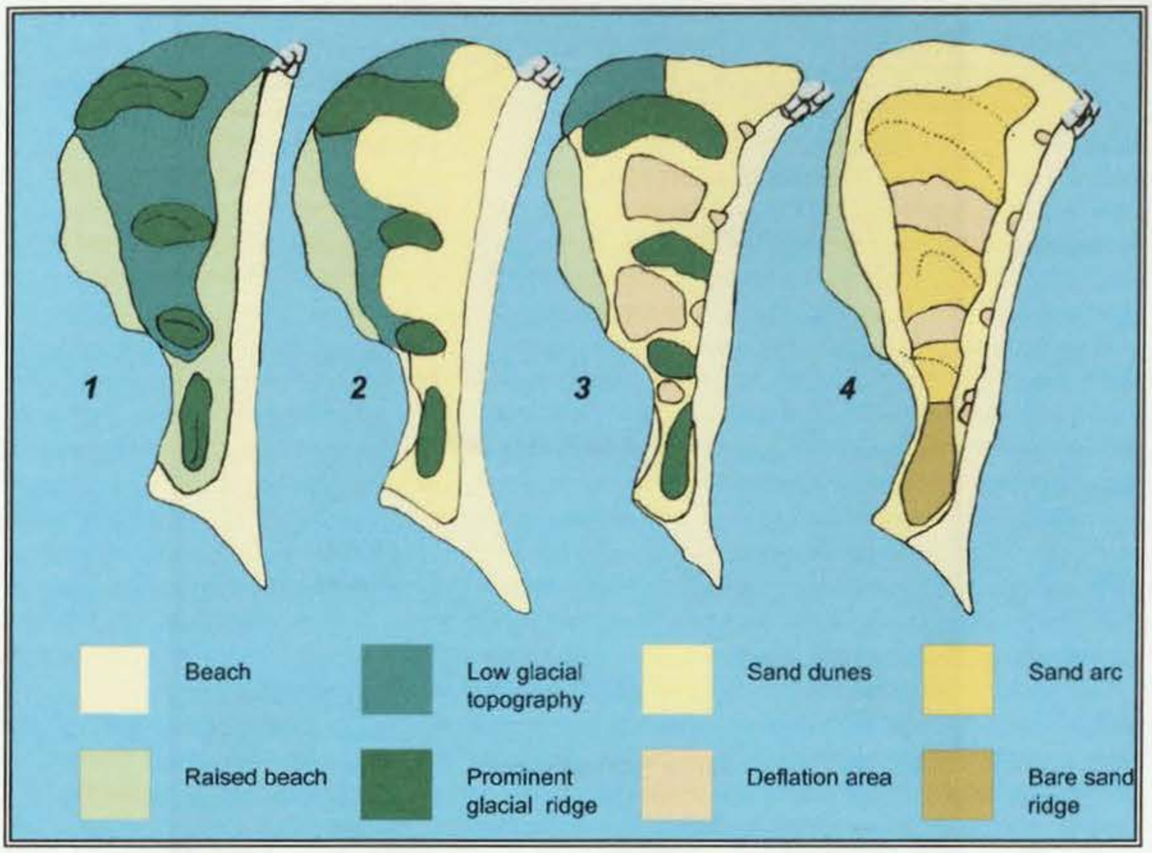


Figure 98: Sands of Forvie: evolution of sand system

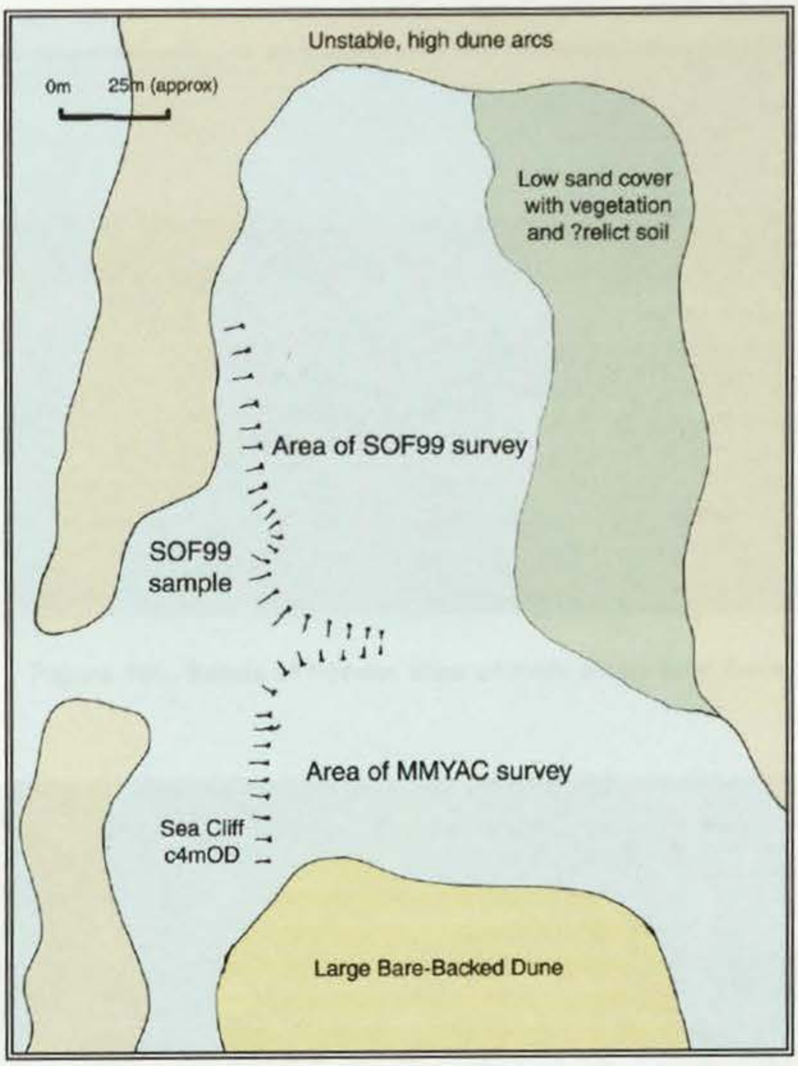


Figure 99: Sands of Forvie: sketch plan of study area

Figure 100: Sands of Forvie: view of main study area from S

Figure 101: Sands of Forvie: flint pebbles visible under deflating sand cover

Figure 102: Sands of Forvie: view of flint bearing surface

(scale with 20cm subdivisions)

Figure 103: Sands of Forvie: MMYAC survey, stone and knapping debris; grid A46

Image ©N Curtis

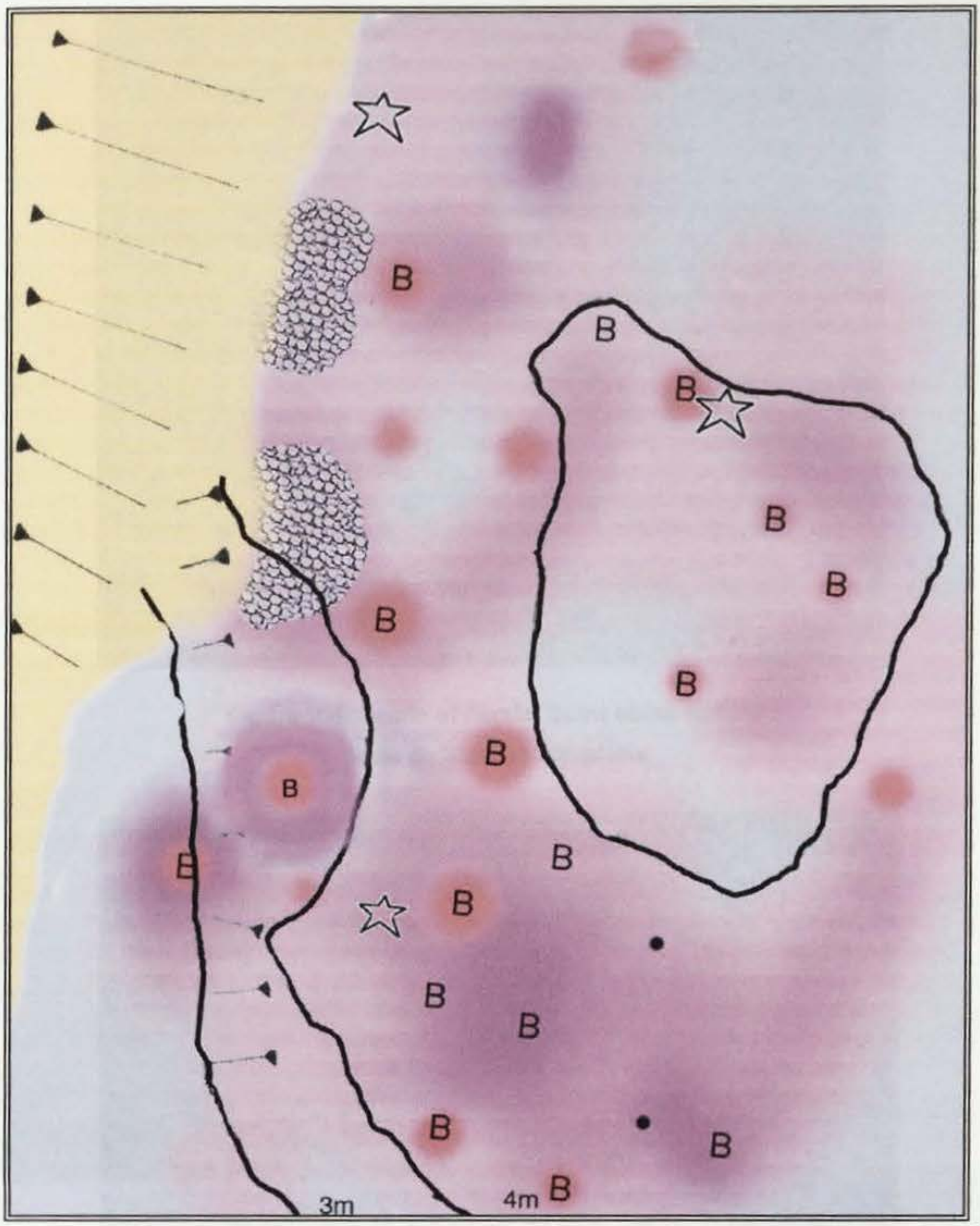


Figure 104: Sands of Forvie: walkover lithic survey.

Darker areas demarcate higher density lithics, Stars mark concentrations of burning. B: blade scatters.

Figure 105: Sands of Forvie: burnt stone feature
Scale @ 20cm subdivisions

Figure 106: Sands of Forvie: burnt stone feature and lithics
Scale @ 20cm subdivisions

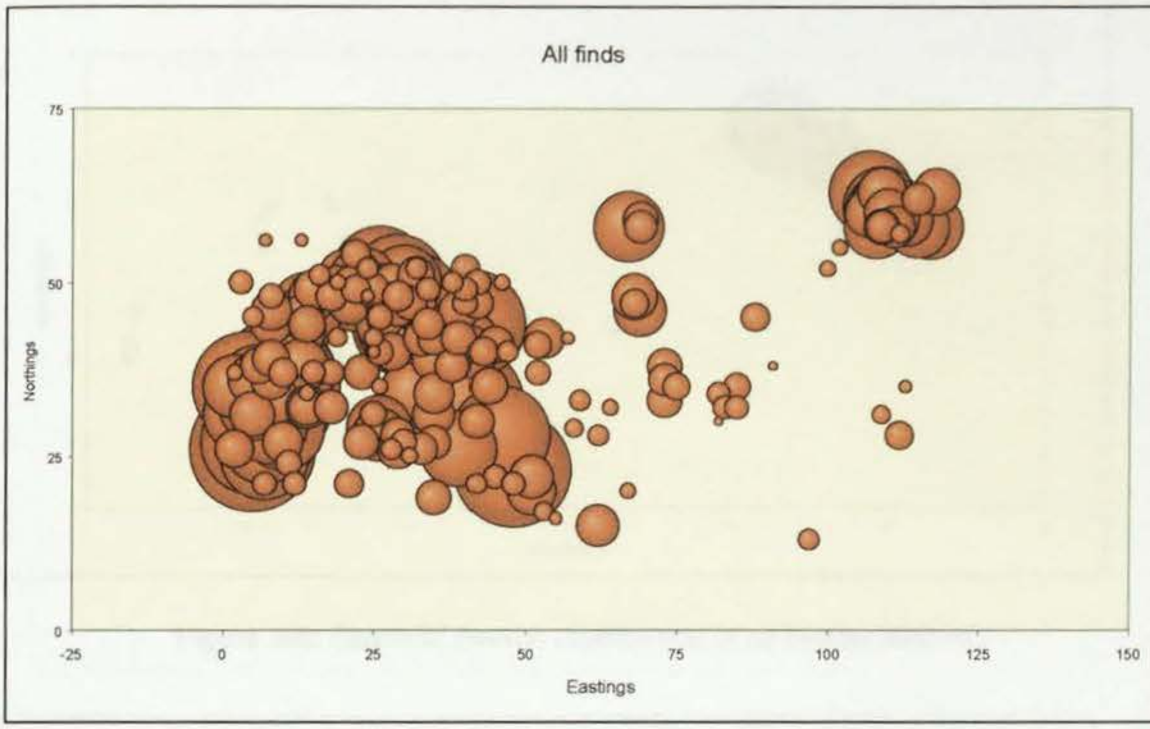


Figure 107: Sands of Forvie: distribution of all finds MMYAC

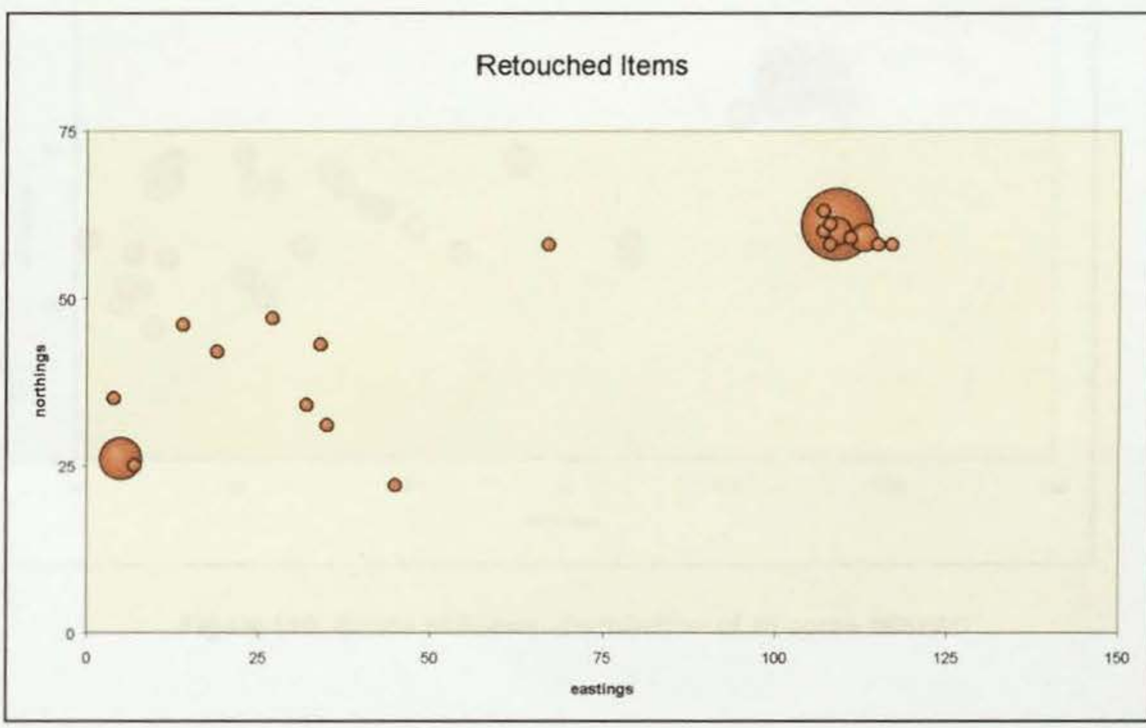


Figure 108: Sands of Forvie: distribution of retouched finds MMYAC

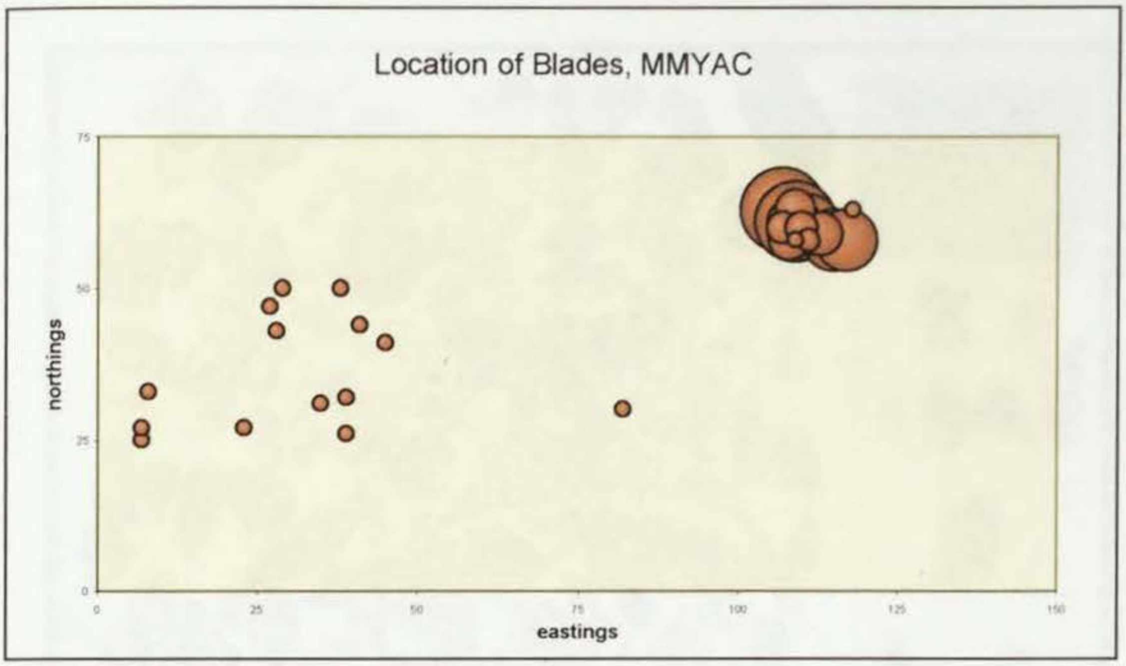


Figure 109: Sands of Forvie: distribution of all blades MMYAC

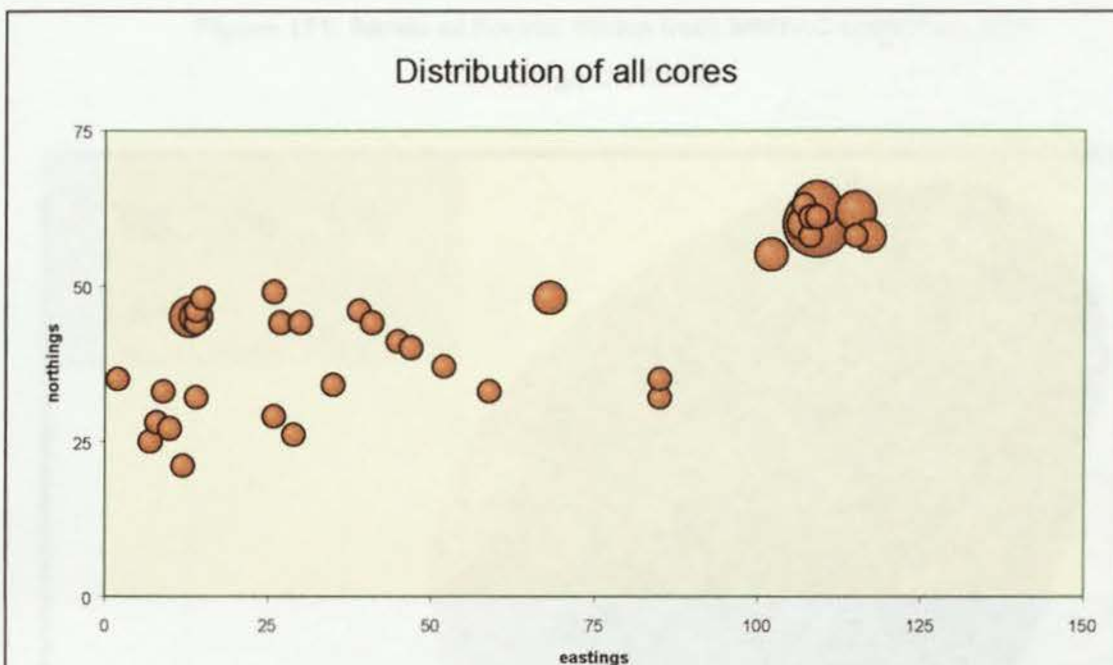


Figure 110: Sands of Forvie: distribution of all cores MMYAC

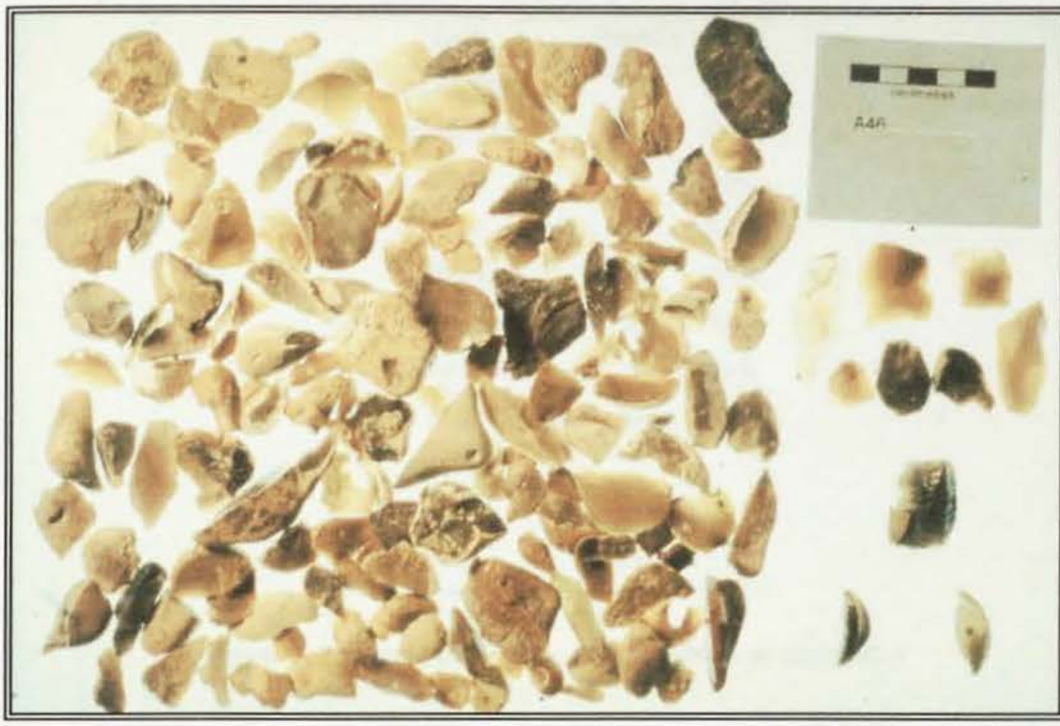


Figure 111: Sands of Forvie: lithics from MMYAC collection, A46

Image ©N Curtis

Figure 112: Sands of Forvie: anvil from MMYAC collection, E4

Image ©N Curtis

Type	Quantity	
Regular Flake	802	15.5%
Irregular Flake	2794	53.9%
Blade	14	0.3%
Core	33	0.6%
Chunk	623	12.0%
Bipolar Core	306	5.9%
Natural Pebble	22	0.4%
Bashed or Split Pebble	589	11.4%
Anvil	1	
Total	5184	

Figure 113: Sands of Forvie: Composition of MMYAC-1

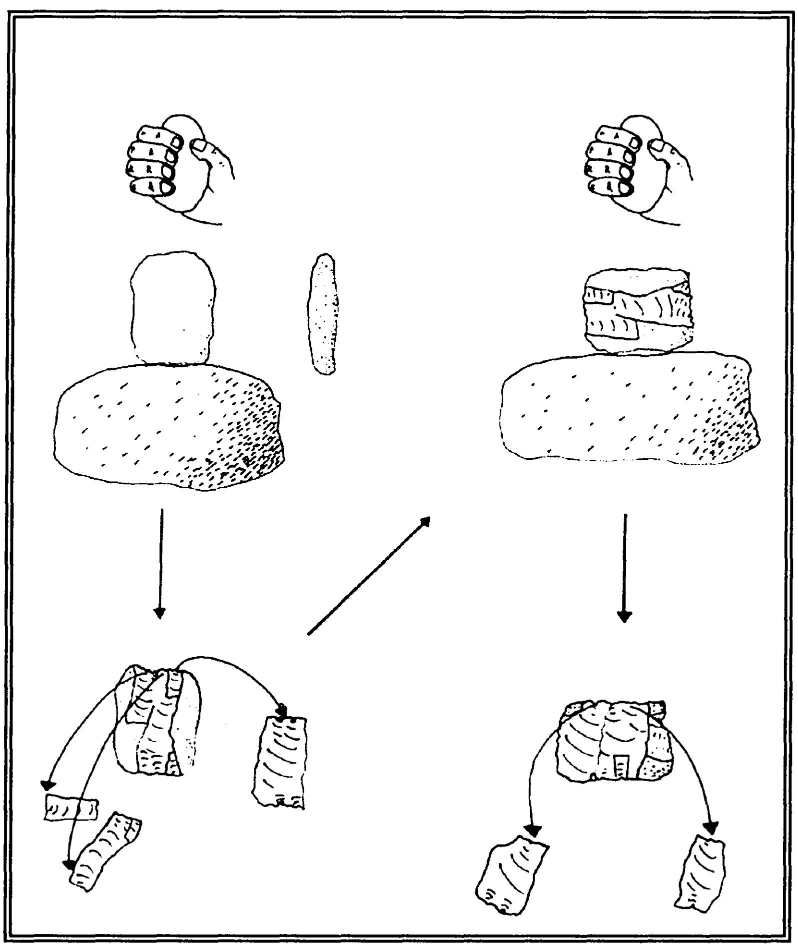


Figure 114: Sands of Forvie: bipolar working traditions (1)

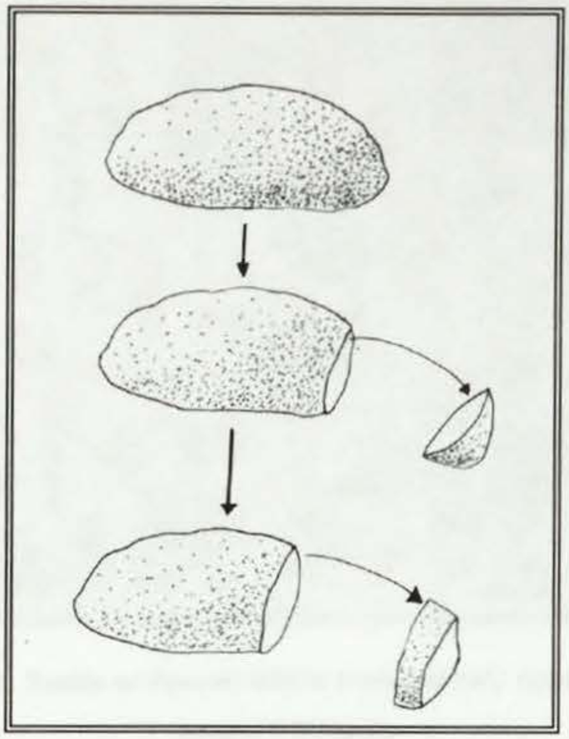


Figure 115: Sands of Forvie: bipolar working traditions (2)

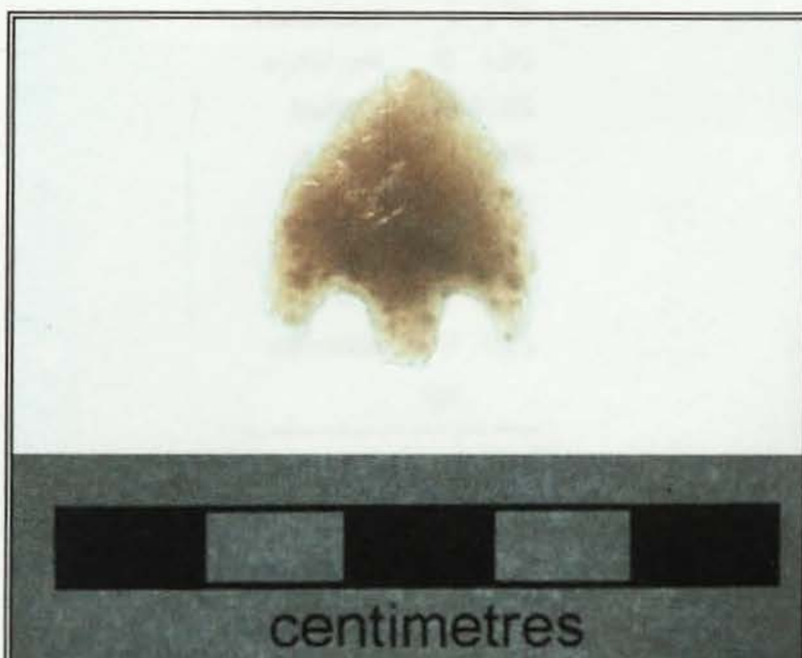


Figure 116: Sands of Forvie: barbed and tanged arrowhead
Image ©N Curtis

Figure 117: Sands of Forvie: lithics from MMYAC collection, F17

Image ©N Curtis

blank	N	
bashed lump	3	0.5%
bipolar core	11	1.8%
blade	186	31.0%
chunk	51	8.5%
core	20	3.3%
flake irreg	179	29.8%
flake reg	149	24.8%
split pebble	1	0.2%
	600	

Figure 118: Sands of Forvie: composition MMYAC 2

Figure 119: Sands of Forvie: blade cores

Image © N Curtis

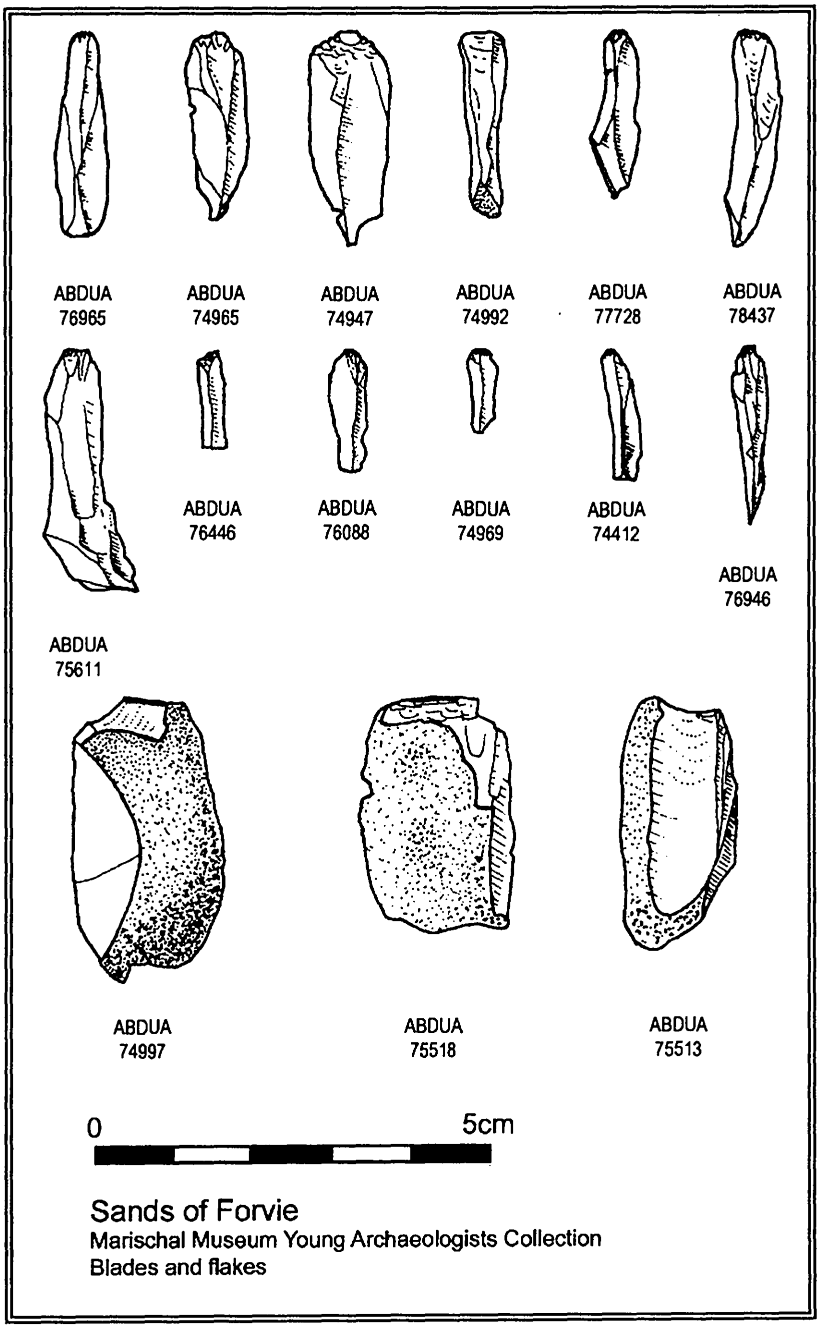


Figure 120: Sands of Forvie: MMYAC lithics (1)

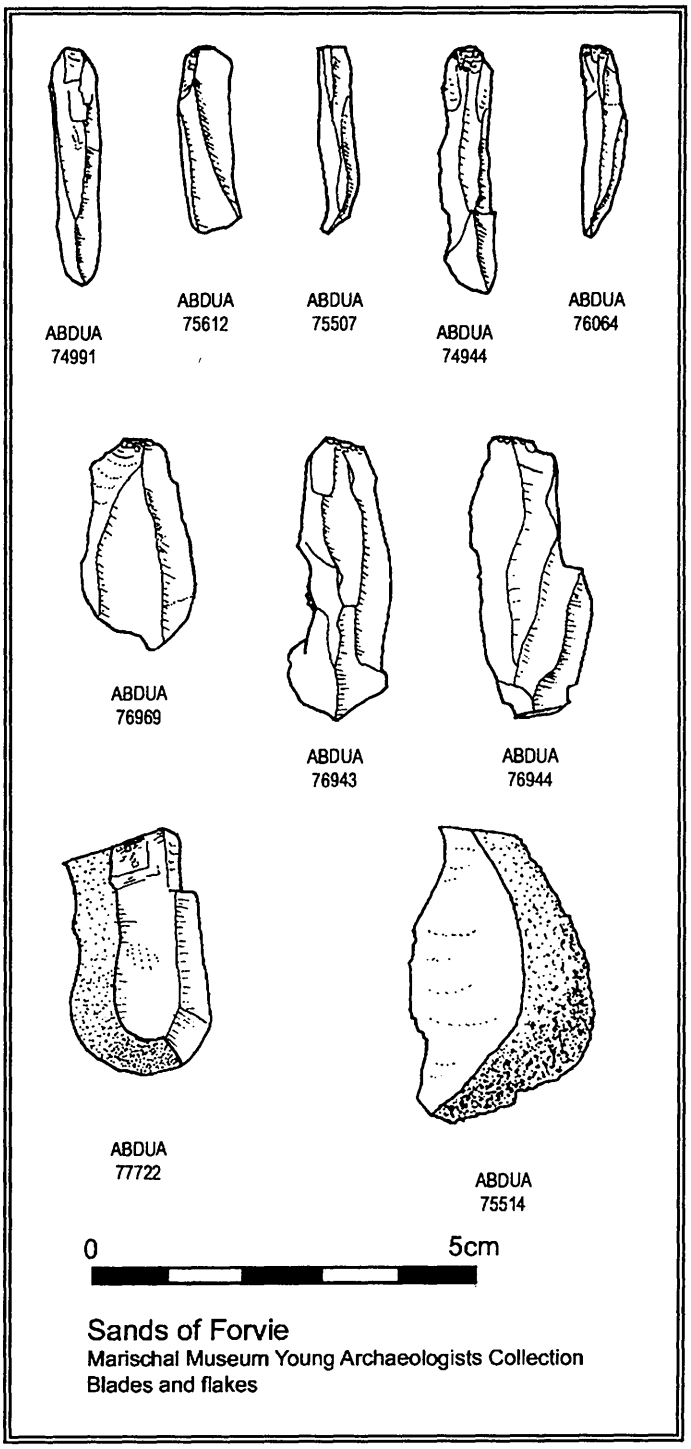


Figure 121: Sands of Forvie: MMYAC lithics (2)

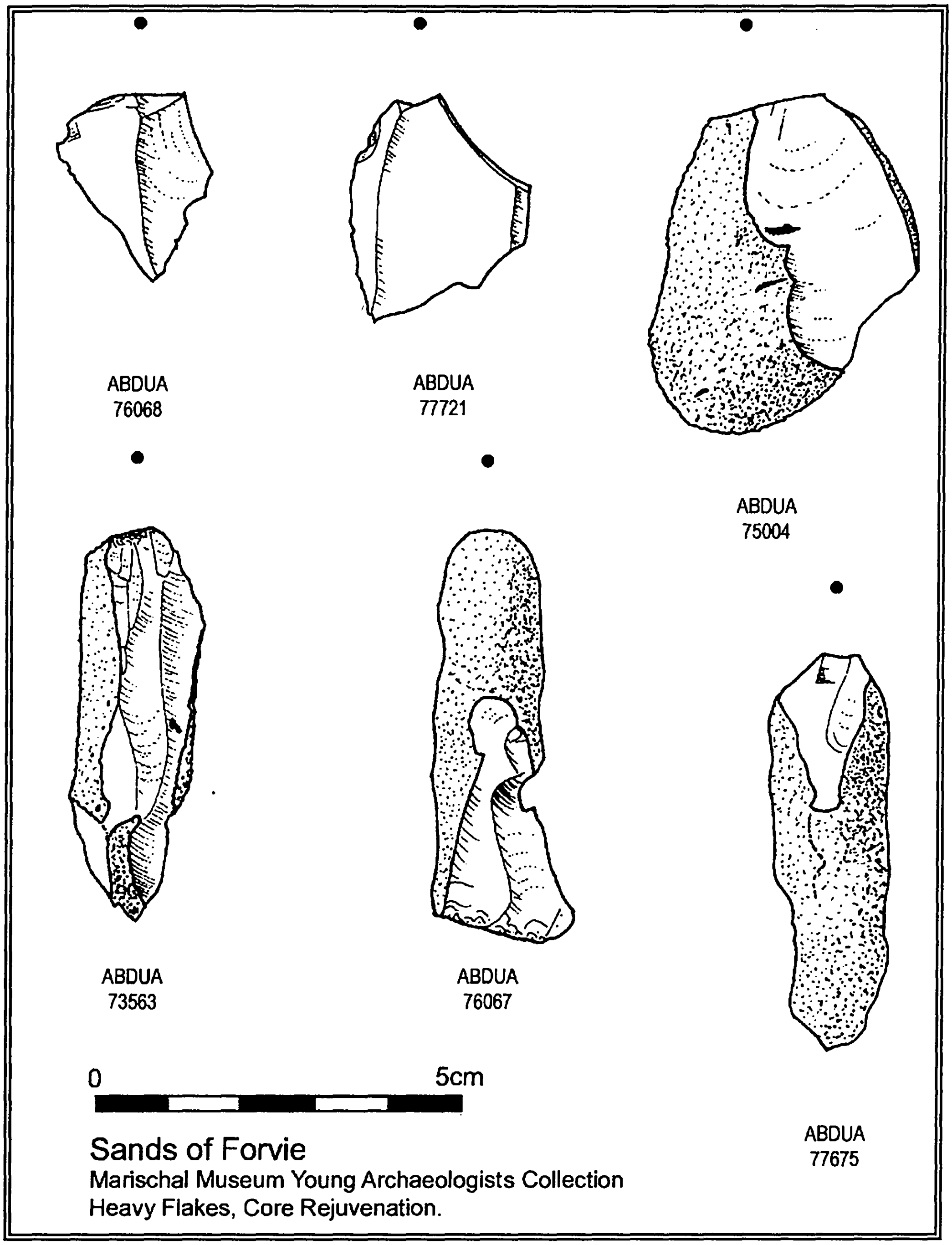


Figure 122: Sands of Forvie: Sands of Forvie: MMYAC lithics (2)

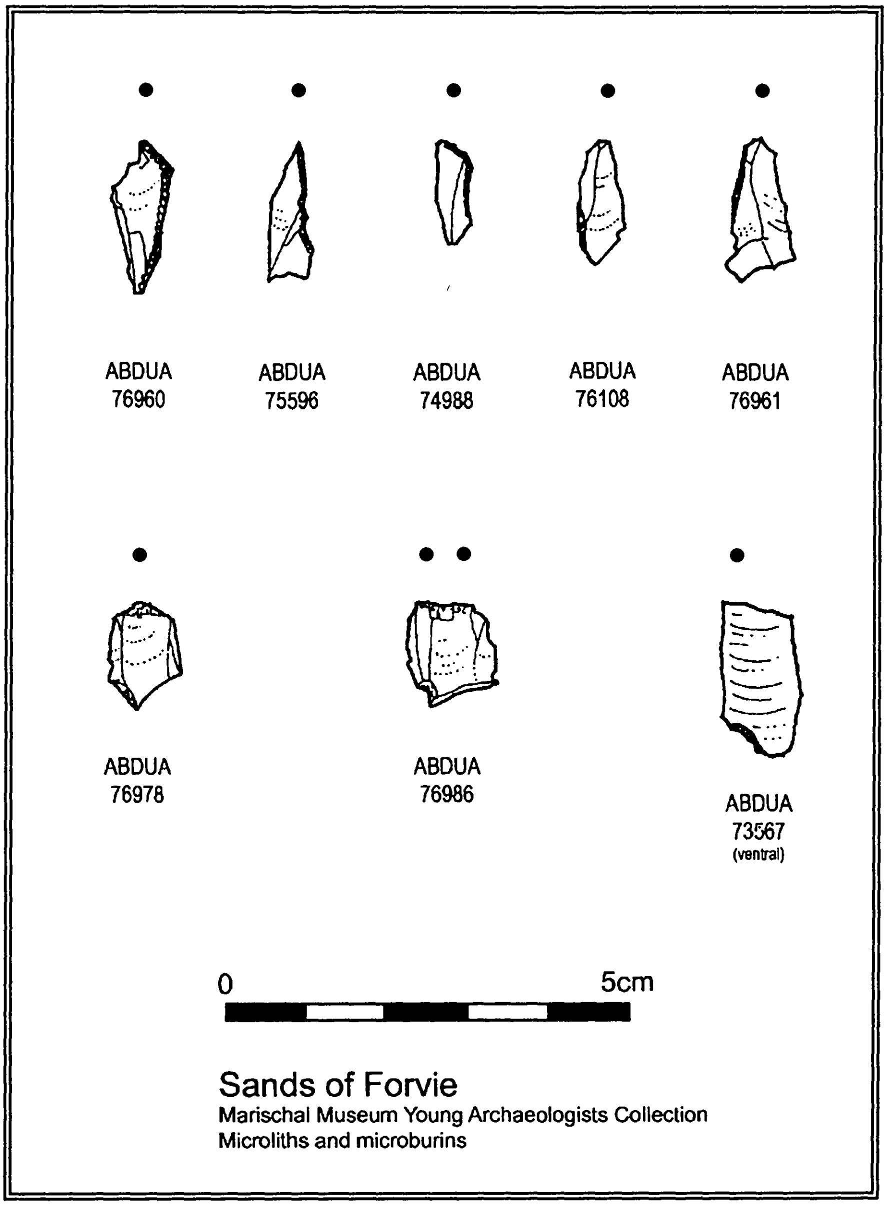


Figure 123: Sands of Forvie: Sands of Forvie: MMYAC lithics (4)

Blank	Total	%
Bashed lump	16	0.3%
Bipolar core	81	1.5%
Blade	1120	20.9%
Chunk	869	16.2%
Core	108	2.0%
Flake irreg	1610	30.1%
Flake reg	1488	27.8%
pebble	1	0.0%
split pebble	60	1.1%
	5353	

Figure 124: Sands of Forvie: composition of assemblage SOF99

Name	Quantity
Microlith	39
Microburin	38
Notched	14
Edge retouched	13
Scraper	8
Graver?	2
Burin	2
Denticulated?	1
Graver	2
Unclassifiable	1

Figure 125: Sands of Forvie: retouched artefacts SOF99

Name	Complete	Broken	indet
Backed blade	1	4	
Right angle truncation	1		
Rod	2	4	
Rod, partially backed	1	2	
rod, truncated	4	2	2
rod?		3	
Unclassified	1	12	
	10	**27**	**2**

Figure 126: Sands of Forvie: microlith types, SOF99

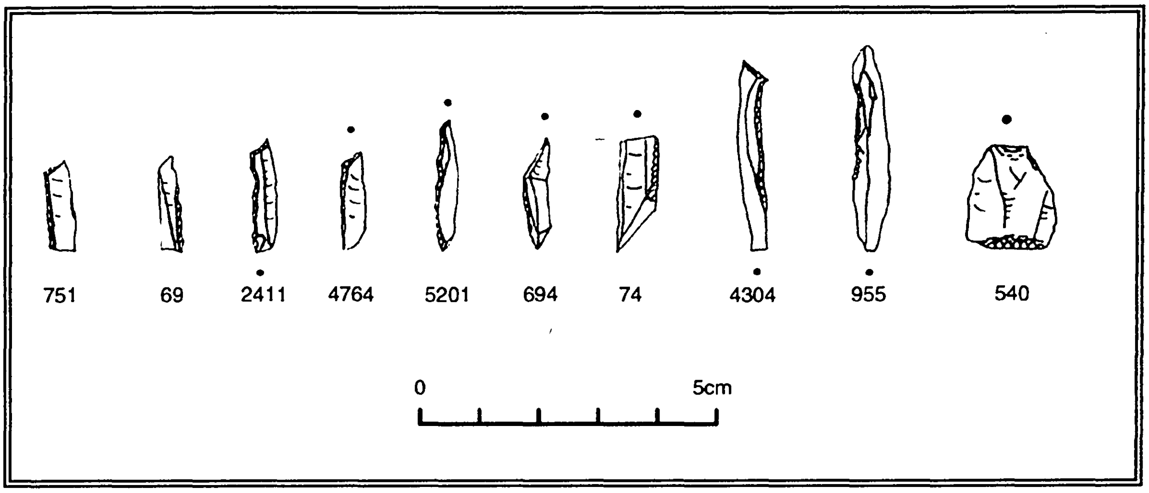


Figure 127: Sands of Forvie: lithics SOF99 (1)

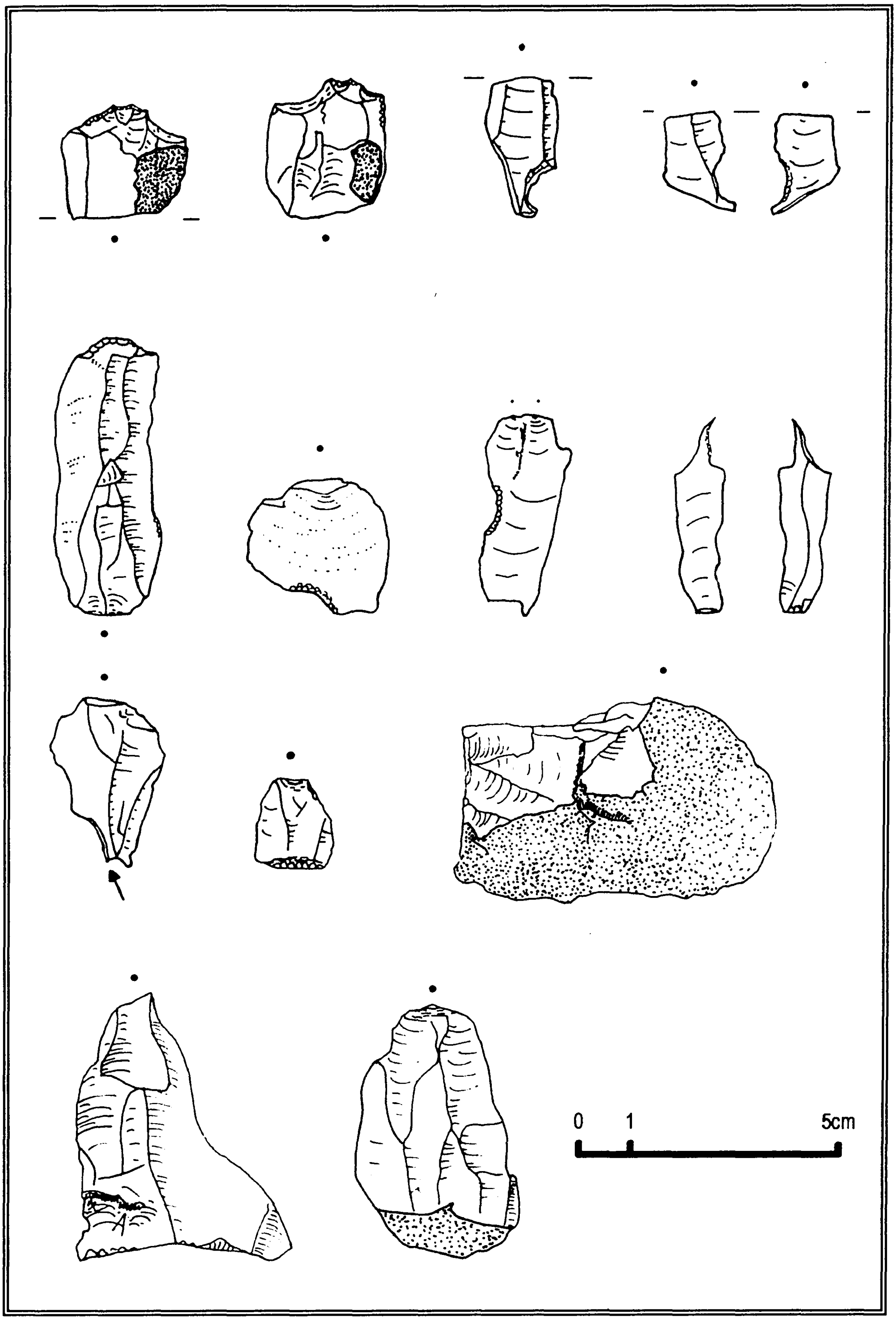


Figure 128: Sands of Forvie: lithics SOF99 (2)

MMYAC	n		Primary		Secondary		Tertiary	
Grey	211	35.9%	27	12.8%	120	56.9%	64	30.3%
Honey	197	33.6%	34	17.3%	75	38.1%	88	44.7%
Light grey	46	7.8%	2	4.3%	12	26.1%	32	69.6%
Pale-honey	33	5.6%	3	9.1%	10	30.3%	20	60.6%
Tan	17	2.9%	8	47.1%	4	23.5%	5	29.4%
Honey-grey	15	2.6%	2	13.3%	6	40.0%	7	46.7%
White	14	2.4%	1	7.1%	5	35.7%	8	57.1%
Dark grey	10	1.7%	2	20.0%	8	80.0%	0	0.0%
Other	44	7.5%	9		18		17	
	587							
SOF99								
Honey	2266	44.7%	520	22.9%	800	35.3%	946	41.7%
Grey	1895	37.4%	258	13.6%	864	45.6%	773	40.8%
Pink	247	4.9%	16	6.5%	66	26.7%	165	66.8%
Red	244	4.8%	30	12.3%	59	24.2%	155	63.5%
Pale-honey	141	2.8%	7	5.0%	21	14.9%	113	80.1%
Brown	58	1.1%	16	27.6%	28	48.3%	14	24.1%
Honey-grey	51	1.0%	10	19.6%	28	54.9%	13	25.5%
White	50	1.0%	1	2.0%	13	26.0%	36	72.0%
grey-honey	48	0.9%	9	18.8%	24	50.0%	15	31.3%
Dark grey	23	0.5%	7	30.4%	12	52.2%	4	17.4%
Clear	20	0.4%	1	5.0%	5	25.0%	14	70.0%
Black	4	0.1%	1	25.0%	1	25.0%	2	50.0%
Others	18	0.4%	2	11.1%	8	44.4%	8	44.4%
	5065		**878**		**1929**		**2258**	

Figure 129: Sands of Forvie: colour of flint & reduction sequences, SOF99/MMYAC-2

SOF99	bashed lump	bipolar core	blade	chunk	core	Flake Irreg	Flake Reg	pebble	split pebble	N
Honey	0.1%	2.0%	19.2%	17.5%	1.4%	35.8%	22.7%	0.0%	1.2%	2266
Grey	0.4%	1.4%	23.3%	11.9%	3.2%	26.5%	31.8%	0.1%	1.4%	1895
Pink	0.8%	0.0%	15.8%	17.0%	0.8%	26.3%	39.3%	0.0%	0.0%	247
Red	0.4%	0.4%	21.3%	21.7%	1.6%	28.7%	25.8%	0.0%	0.0%	244
Pale-honey	0.0%	0.7%	34.0%	7.8%	0.7%	17.0%	39.7%	0.0%	0.0%	141
Brown	0.0%	1.7%	17.2%	12.1%	1.7%	36.2%	31.0%	0.0%	0.0%	58
Honey-grey	0.0%	2.0%	17.6%	11.8%	5.9%	29.4%	29.4%	0.0%	3.9%	51
White	2.0%	0.0%	36.0%	10.0%	2.0%	16.0%	32.0%	0.0%	2.0%	50
Grey-honey	0.0%	6.3%	25.0%	14.6%	0.0%	33.3%	18.8%	0.0%	2.1%	48
Dark grey	0.0%	4.3%	8.7%	39.1%	4.3%	21.7%	17.4%	0.0%	4.3%	23
Clear	0.0%	0.0%	40.0%	15.0%	0.0%	25.0%	20.0%	0.0%	0.0%	20
Black	0.0%	0.0%	0.0%	25.0%	0.0%	25.0%	50.0%	0.0%	0.0%	4
Other	0.0%	0.0%	22.2%	22.2%	0.0%	22.2%	33.3%	0.0%	0.0%	18
Total	0.3%	1.6%	21.30%	15.2%	2.1%	30.6%	27.8%	0.0%	1.2%	5065
MMYAC										
Grey	0.9%	2.80%	34.1%	5.7%	6.2%	22.7%	27.5%			211
Honey		1.50%	25.9%	8.6%	1.0%	41.6%	20.8%		0.5%	197
Light grey			45.7%	6.5%	2.2%	17.4%	28.3%			46
Pale-honey			51.5%	9.1%		15.2%	24.2%			33
Tan		5.90%	5.9%	29.4%		35.3%	23.5%			17
Honey-grey			33.3%	6.7%		26.7%	33.3%			15
White			50.0%	14.3%		7.1%	28.6%			14
Dark grey	10.0%				10.0%	50.0%	30.0%			10
Other	0.0%	2.30%	22.7%	15.9%	6.8%	25.0%	27.3%		0.0%	44
	0.5%	1.90%	31.3%	8.5%	3.4%	29.0%	25.2%		0.2%	587

Figure 130: Sands of Forvie: colour of flint and artefact types, SOF99/MMYAC-2

SOF99	Avg	N	MMYAC	Avg	N
honey	21.7±10.4	1554		22.1±9.5	113
grey	28±13.2	1367		33.7±12.2	109
pink	23.8±11.3	187			
red	18.9±8.8	161			
white	21.8±10.4	90		23.7±6.1	3
pale-honey	24.8±12	83		28.3±8.9	16
grey-honey	31.3±10.4	40			
honey-grey	28.1±13.7	39		33.6±18.2	10
Brown	25.1±10.9	38			
dark grey	23.9±7.6	18		44.4±16.6	7
Clear	16.6±7.7	11			
light grey				30.9±13	22
tan				18.1±5.3	11

Figure 131: Sands of Forvie: colour of flint and artefact sizes, SOF99/MMYAC-2

	SOF99	%	MMYAC-2	
Bashed lump	16	0.3%	3	0.5%
Bipolar core	81	1.5%	11	1.8%
Blade	1120	20.9%	186	31.0%
Chunk	869	16.2%	51	8.5%
Core	108	2.0%	20	3.3%
Flake: irreg	1610	30.1%	179	29.8%
Flake reg	1488	27.8%	149	24.8%
Pebble	1	0.0%		
Split pebble	60	1.1%	1	0.2%
	5353		600	

Figure 132: composition of assemblages, SOF99/MMYAC-2

	primary	% of blank	Secondary	% of blank	tertiary	% of blank	Total
SOF99							
blade	7	0.6%	249	22.2%	864	77.1%	1120
chunk	215	24.7%	333	38.3%	321	36.9%	869
flake irreg	583	36.2%	589	36.6%	438	27.2%	1610
flake reg	11	0.7%	708	47.6%	769	51.7%	1488
	816	16.0%	1879	36.9%	2392	47.0%	5087
MMYAC-C							
blade			45	24.2%	141	75.8%	186
chunk	18	35.3%	26	51.0%	7	13.7%	51
flake irreg	70	39.1%	74	41.3%	35	19.6%	179
flake reg			90	60.4%	59	39.6%	149
	88	15.6%	235	41.6%	242	42.8%	565

Figure 133: Sands of Forvie: reduction evidence, SOF99/ MMYAC-2

	1 Plat		2 Plat		3 Plat		
SOF99	63	76.8%	17	20.7%	2	2.4%	82
MMYAC	13	81.3%	2	12.5%	1	6.3%	16
Avg Weight MMYAC	69.3±52.5						
Avg Weight SOF99	61.7±42.1						

Figure 134: Sands of Forvie: cores, SOF99/MMYAC-2

	none		simple		N
SOF99					
blade	32	13.9%	199	86.1%	231
flake reg	77	33.9%	150	66.1%	227
flake irreg	59	69.4%	26	30.6%	85
MMYAC-C					
blade	13	11.3%	102	88.7%	115
Flake Reg	28	34.1%	54	65.9%	82
Flake irreg	31	73.8%	11	26.2%	42

Figure 135: Sands of Forvie: platform preparation, SOF99/ MMYAC-2

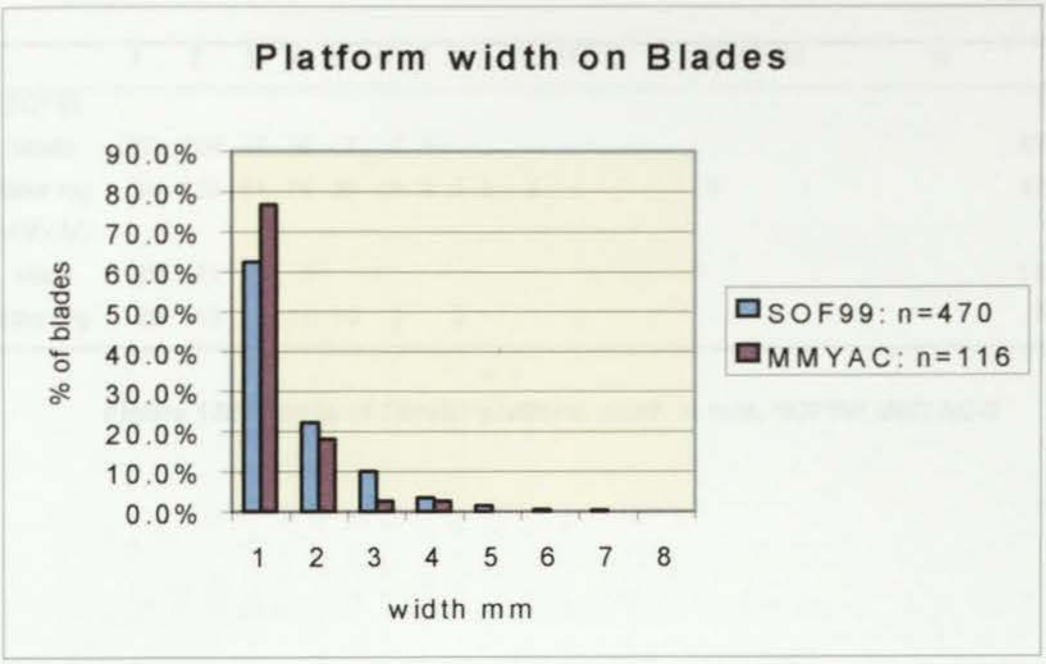


Figure 136: Sands of Forvie: platform width on blades

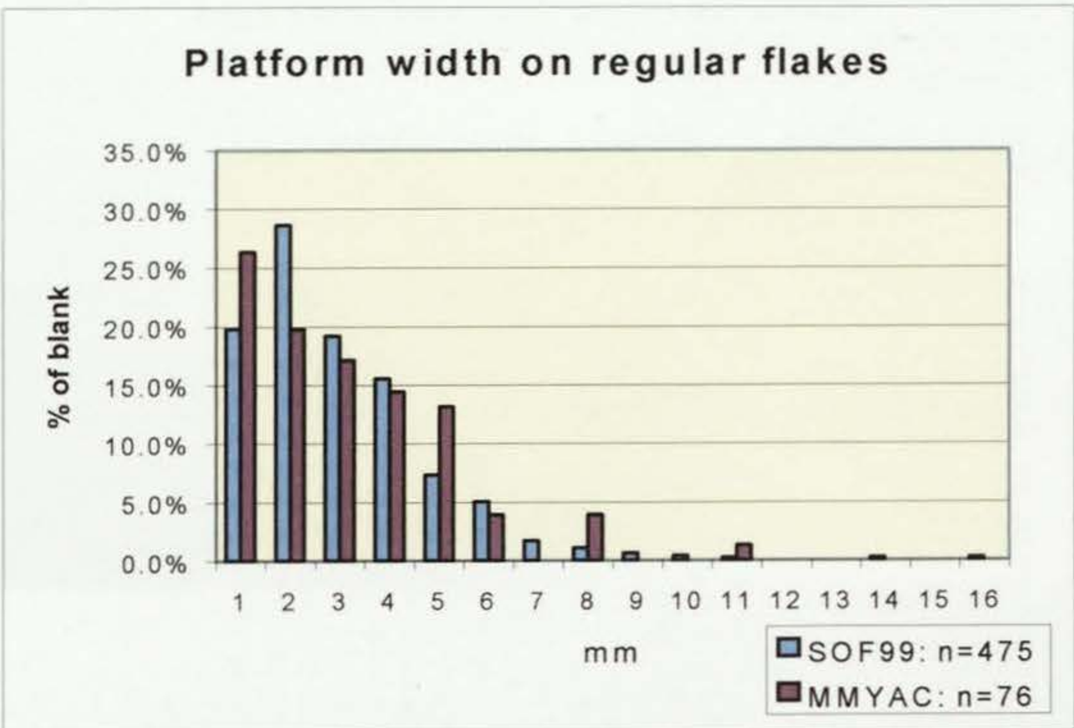


Figure 137: Sands of Forvie: platform width on flakes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	N
SOF99																	
blade	293	104	47	16	7	2	1										470
flake reg	94	136	91	74	35	24	8	5	3	2	1			1		1	475
MMYAC																	
blade	89	21	3	3													116
flake reg	20	15	13	11	10	3		3			1						76

Figure 138: Sands of Forvie: platform width in mm, SOF99/ MMYAC-2

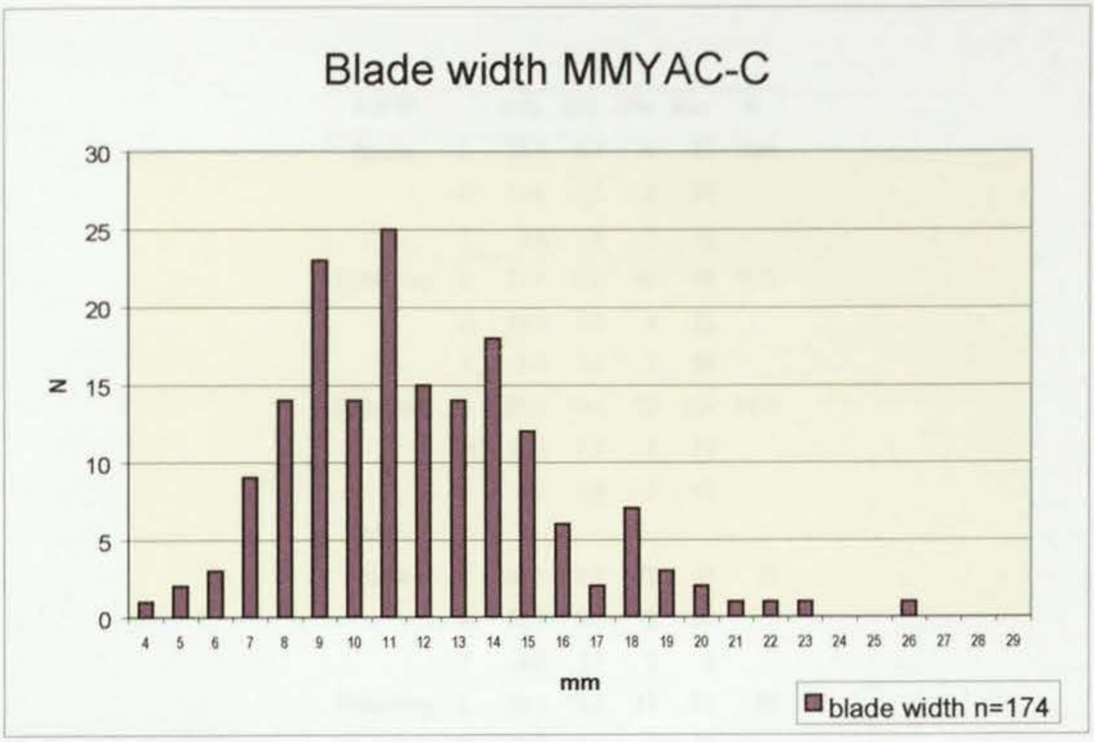


Figure 139: Sands of Forvie: blade width (mm) MMYAC

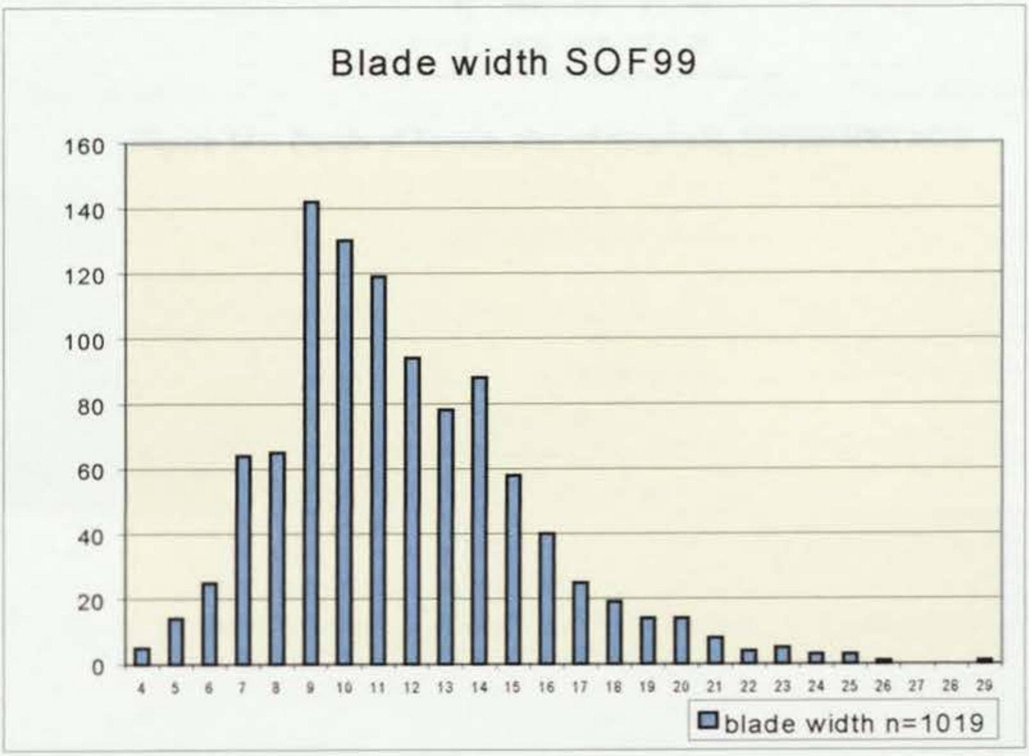


Figure 140: Sands of Forvie: blade width (mm) MMYAC

SOF99		Avg	Std	Min	Max	N
Blades	L	25.9	9.7	10	59	1090
	W	11.5	3.8	3	29	
	T	3.9	1.6	1	14	
Falek Irreg	L	21.4	10.0	10	79	1543
	W	16.0	8.0	4	75	
	T	5.4	3.2	1	30	
Flake Reg	L	26.0	10.5	10	104	1470
	W	17.9	7.7	4	76	
	T	5.7	3.5	1	47	
MMYAC						
Blade	L	34.1	8.2	16	56	71
	W	12.3	3.7	6	23	
	T	4.0	1.7	2	9	
Flake Irreg	L	23.0	11.9	11	71	89
	W	16.3	7.5	6	44	
	T	5.4	3.4	1	20	
Flake Reg	L	31.0	12.2	15	73	85
	W	19.8	8.7	7	49	
	T	6.3	3.5	1	21	

Figure 141: Sands of Forvie: size of removals, SOF99/ MMYAC-2

very similar	slight differences	very different
	Size and character	
similar size		density very different
		presence of burning
	Proportion of artefacts	
similar proportion of retouched		formal morphological types of tools very different
similar proportion of bipolar cores		higher proportion of chunks at SOF99
similar proportion of primary pieces	SOF slightly more tertiary pieces, especially on irregular flakes and chunks	
		much higher proportion blades at MMYAC
	Production evidence	
similar width of blades, similar frequency of tertiary blades		MMYAC has longer blades and regular flakes
	MMYAC has slightly larger cores, possibly with fewer platforms.	
Extent of platform preparation		Platform width on different artefacts
	Raw Materials	
		SOF has red flint not present at MMYAC
	slight differences in use of grey and honey flint	MMYAC reliance upon light grey flint
Importance of pale-honey flint		MMYAC large flakes of dark grey flint

Figure 142: Sands of Forvie: comparison of assemblages, SOF99/ MMYAC-2

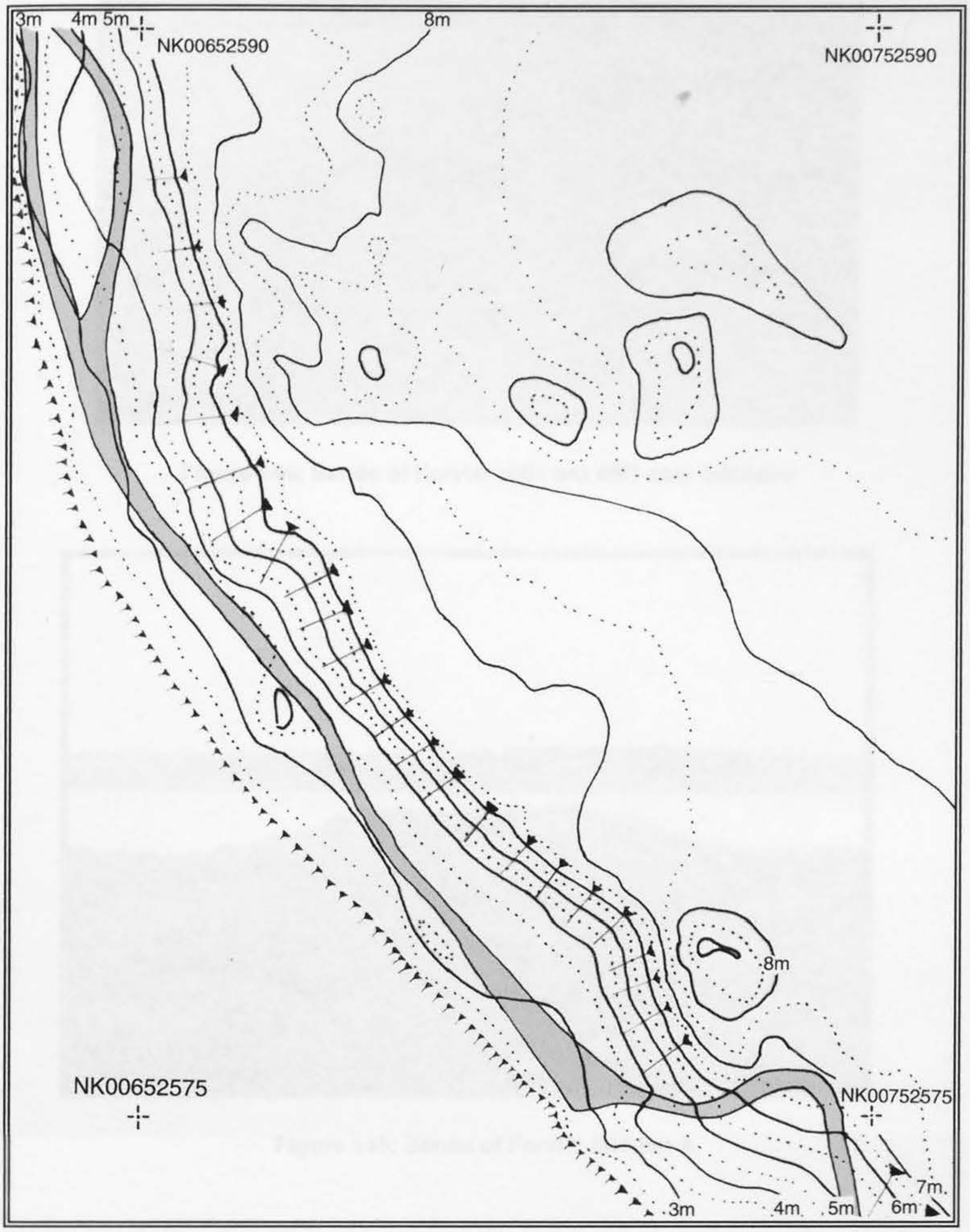


Figure 143: Sands of Forvie: middens contour survey

Footpath highlighted in grey

Figure 144: Sands of Forvie: relic sea cliff near middens

Figure 145: Sands of Forvie: Midden A

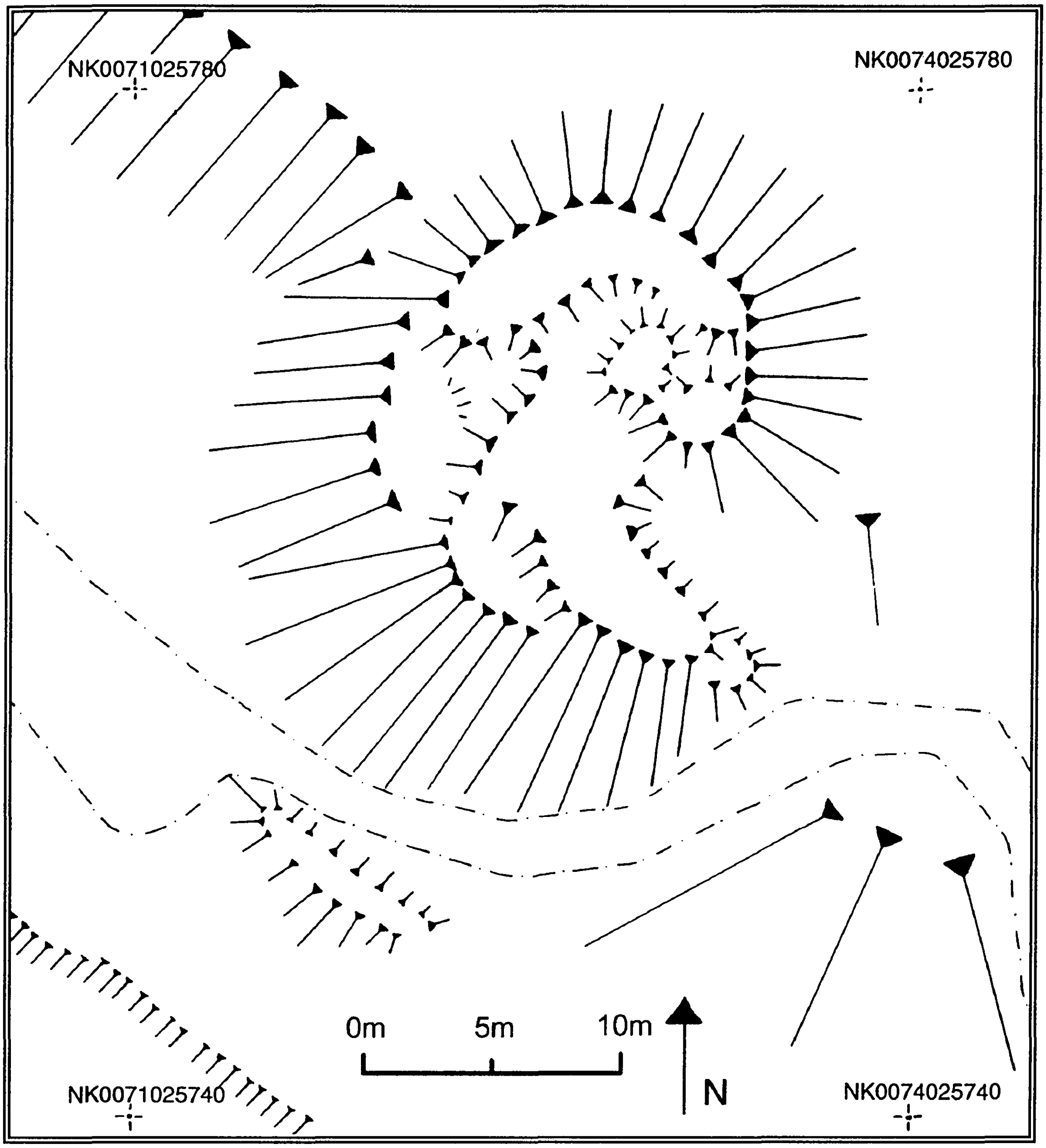


Figure 146: Sands of Forvie: Midden A Plan

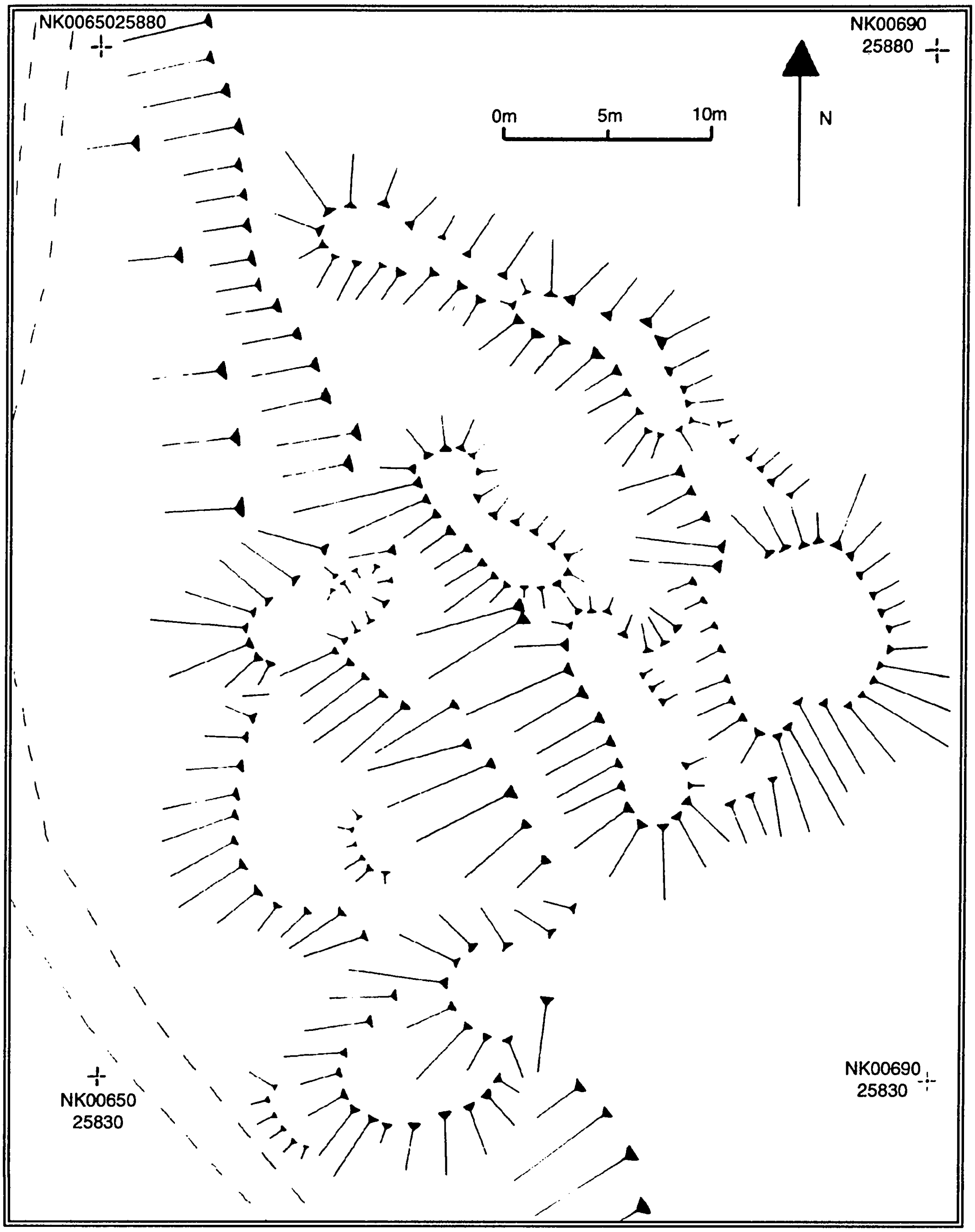


Figure 147: Sands of Forvie: Midden B, plan

Figure 148: Sands of Forvie: Midden B

Figure 149: Sands of Forvie: Midden C

Feature	Hearth	structural evidence	Manuports	Bashed Lumps	Cores	Reuves	Primary	Secondary	Punched	Chips	N	Ret	Retouched	Util	Utilised	Grp1	Grp2	Grp3	Notes
T46.I	yes	scoop	14	2	3	3	2	15	3	19	61	7	11.5%	4	6.6%	21	27	13	"artefacts ... cluster around the hearths and often lie immediately beside or just beneath the heaped stones." (322), "composition seems consistently varied" (323)
T46.II	yes	scoop	6	2	2	5	5	14	2	26	62	6	9.7%	3	4.8%	32	22	8	"artefacts ... cluster around the hearths and often lie immediately beside or just beneath the heaped stones." (322), "composition seems consistently varied" (323)
T46.III	yes	scoop	7	2	4	2	2	5	2	17	41	4	9.8%	2	4.9%	14	17	10	"artefacts ... cluster around the hearths and often lie immediately beside or just beneath the heaped stones." (322), "composition seems consistently varied" (323)
T46.IV	yes	?	1		1		1	5	1	8	17	1	5.9%	4	23.5%	6	8	3	
T46.V-VI	yes		12			4		9	1	22	48	2	4.2%	3	6.3%	22	11	15	scattered artefacts within discoloured area
T46.VII	yes	compact discolouration	5		1		1	2	2	4	15	0	0.0%	0	0.0%	4	6	5	
T53	yes	none	9		3	2	6	14	2	41	0 77 0	3	3.9%	3	3.9%	31	40	6	artefacts mainly with 0.5m of hearth

Feature	Hearth	structural evidence	Manuports	Bashed Lumps	Cores	Reuves	Primary	Secondary	Punched	Chips	N	Ret	Retouched	Util	Utilised	Grp1	Grp2	Grp3	Notes
T43	yes	stake holes and bank	17	2	8	9	12	51	8	111	218	18	8.3%	16	7.3%	131	69	18	"finds ... tend to be sitributed in the western part (both indside and out) along the inner eshe and a the esatern end approaching the hearth." (329)
											0								
T44/47/5 5/56.I	no	scoop, windbr eaks	1	2	1	2	2	29	9	62	108	10	9.3%	7	6.5%	58	44	6	"very few signs of primary flaking here"
T44/47/5 5/56.II	yes	structur e	8	1	1	10	9	46	7	91	173	10	5.8%	12	6.9%	69	90	14	"stone artefacts ... concentrated upoon two dark aresa, one within the walls and a darker are immediately against the southern wall."
T44/47/5 5/56.III	no	windbr eak	9	3	2	16	29	95	11	198	363	34	9.4%	22	6.1%	154	196	13	artefacts to both sides of shelter
T44/47/5 5/56.IV	indet	none	3	7	3	5	17	49	5	208	297	19	6.4%	9	3.0%	105	180	12	
T44/47/5 5/56.V	indet	none	1	2		3	17	49	8	105	185	13	7.0%	12	6.5%	67	114	4	
T44/47/5 5/56.VI	indet	none		2		2	9	22	6	28	69	7	10.1%	12	17.4%	31	38		

Figure 150: Morton: composition of assemblage in different areas

feature	hearth	strctural feature	Small Edge	Large Edge	Burins	Scrapers	Microliths	Blade with Polish	Awl	Notched	Utilised	Other	N	Notes
T46.I	yes	scoop	1	1	1	1	2	1	0	0	4	50	61	"artefacts ... cluster around the hearths and often lie immediately beside or just beneath the heaped stones." (322), "composition seems consistently varied" (323)
T46.II	yes	scoop	2	0	0	0	2	0	1	1	3	53	62	"artefacts ... cluster around the hearths and often lie immediately beside or just beneath the heaped stones." (322), "composition seems consistently varied" (323)
T46.III	yes	scoop	0	1	1	0	1	0	0	1	2	35	41	"artefacts ... cluster around the hearths and often lie immediately beside or just beneath the heaped stones." (322), "composition seems consistently varied" (323)
T53	yes	none	1				2					74	77	

feature	hearth	strctural feature	Small Edge	Large Edge	Burins	Scrapers	Microliths	Blade with Polish	Awl	Notched	Utilised	Other	N	Notes
T43			5	1	1	1	6					204	218	
T44/47/55/56.I	no	scoop/stakes	6				3		1					
T44/47/55/56.II	yes	stake strucre	5				1							3 microburins
T44/47/55/56.III			12		3	4	7	2						5 microburins
T44/47/55/56.IV		none	6	1	2	2	1		1		9			1 backed flake
T44/47/55/56.V		none	5	1	2	1	3				12			1 microburin, 1 backed flake
T44/47/55/56.VI		none	1	1	1		1		1		12			1 microburin, 2 backed flakes, 5 miscellaneous

Figure 151: Morton: composition of retouched components in different areas

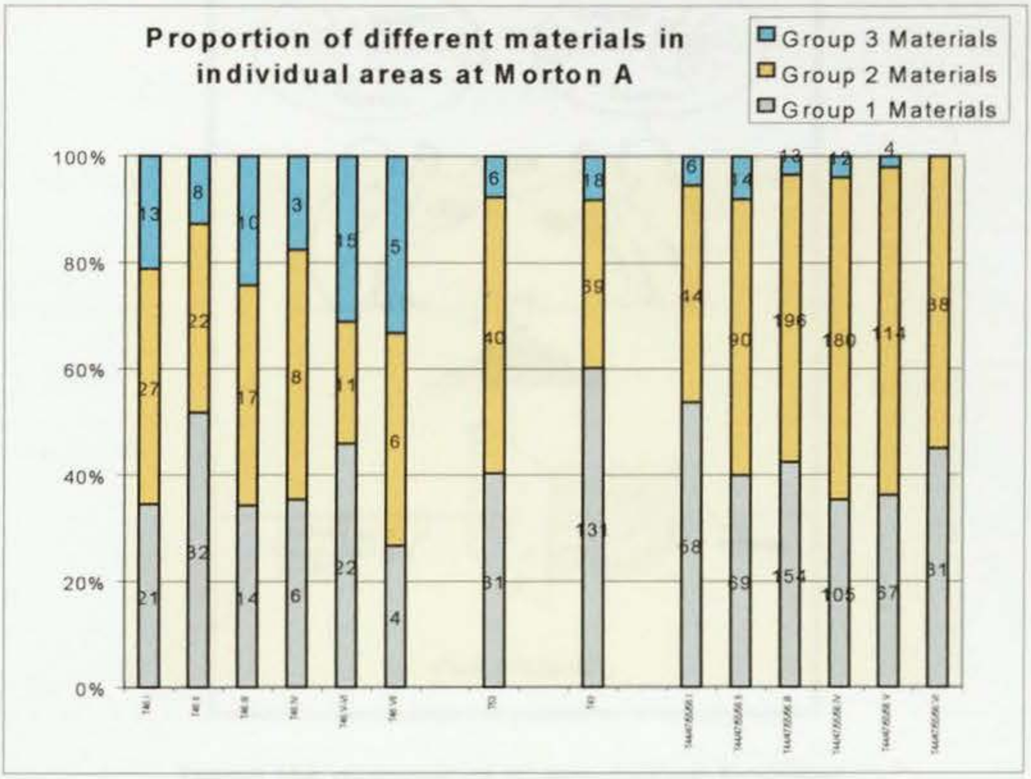


Figure 152: Proportions of raw materials at Morton A

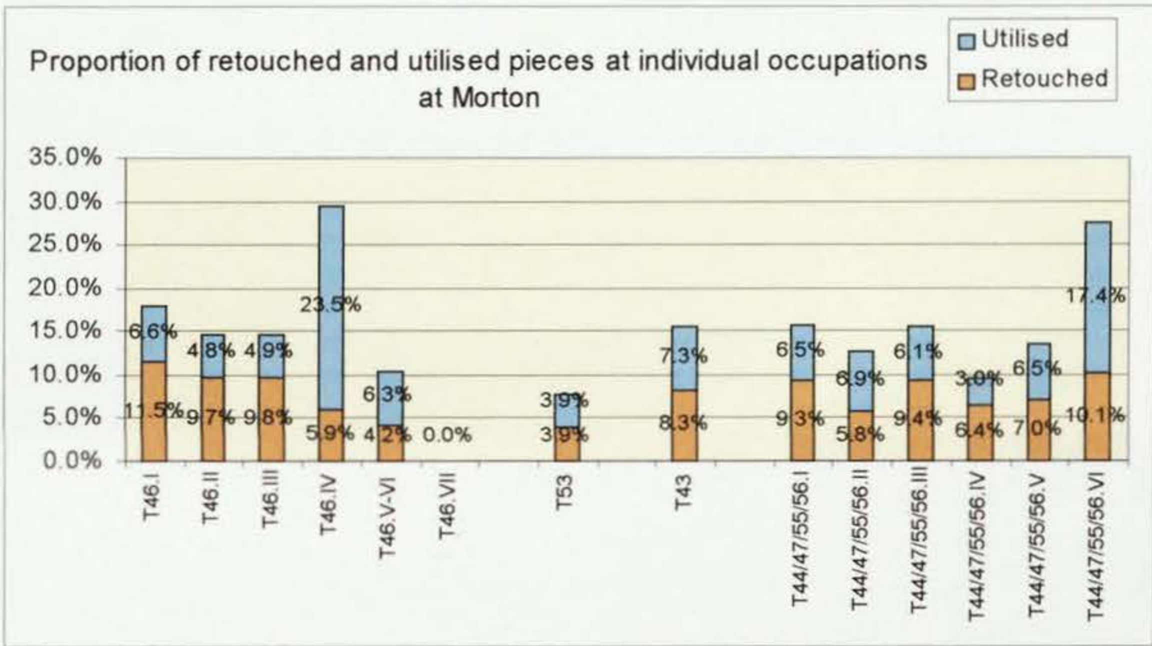


Figure 153: Proportions of raw materials at Morton A

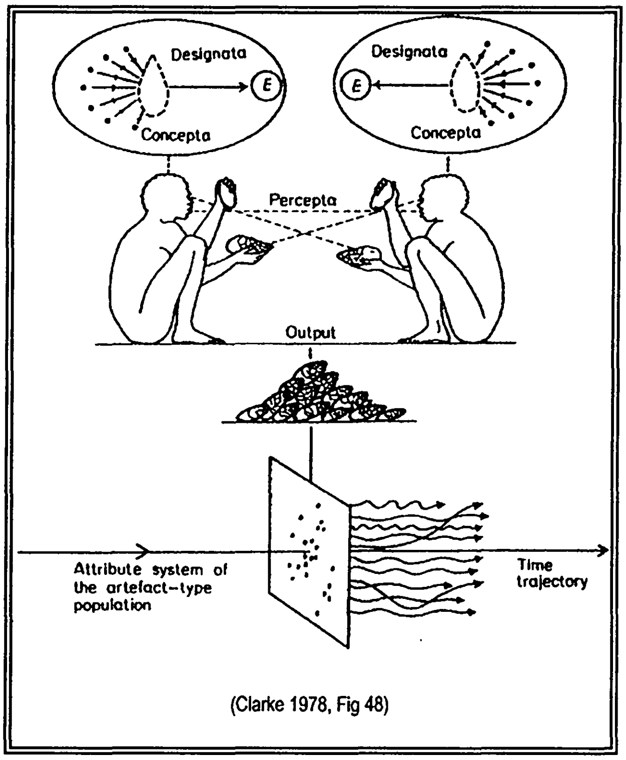


Figure 154: conceptions of manufacture: templates

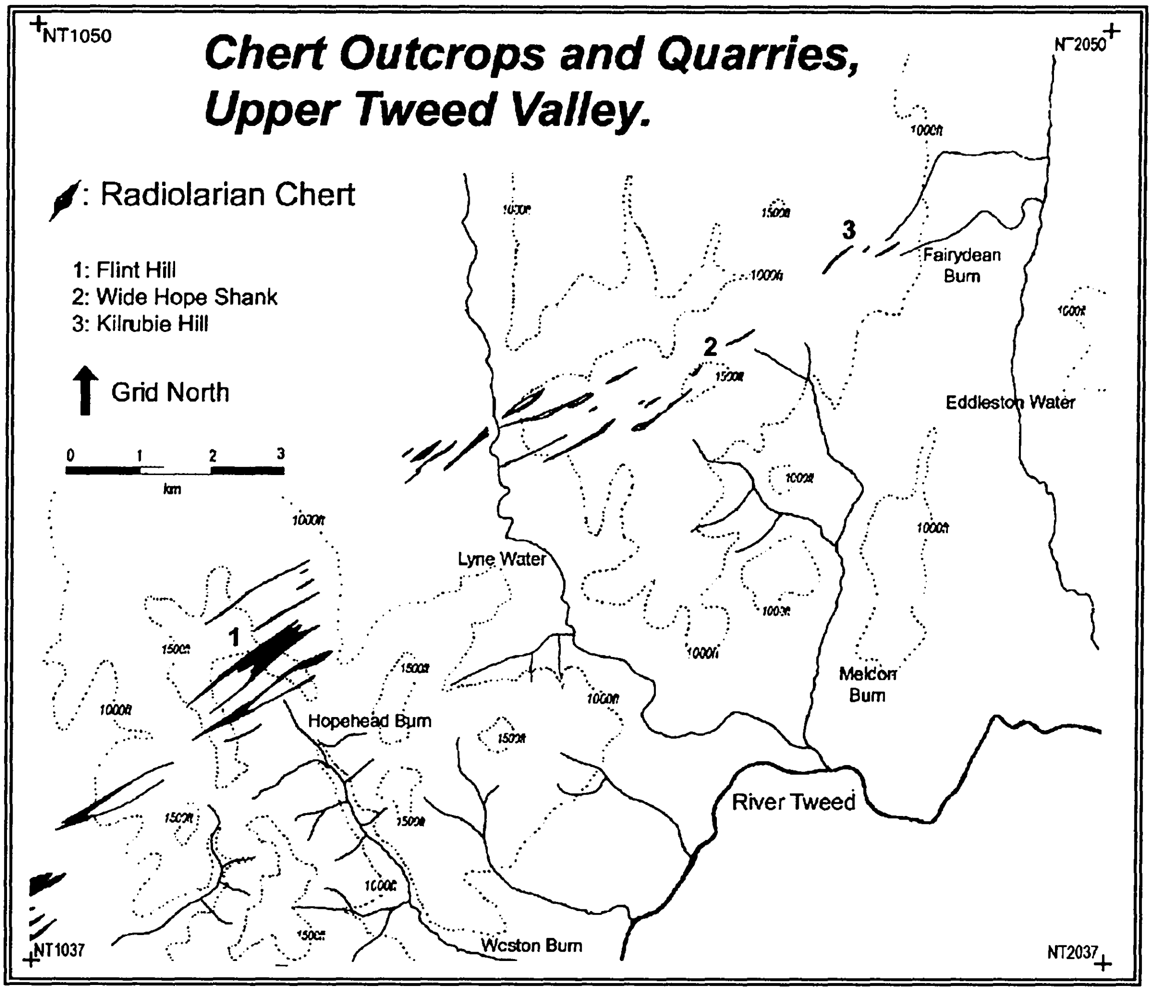


Figure 155: Chert outcrops and quarries, Upper Tweed Valley

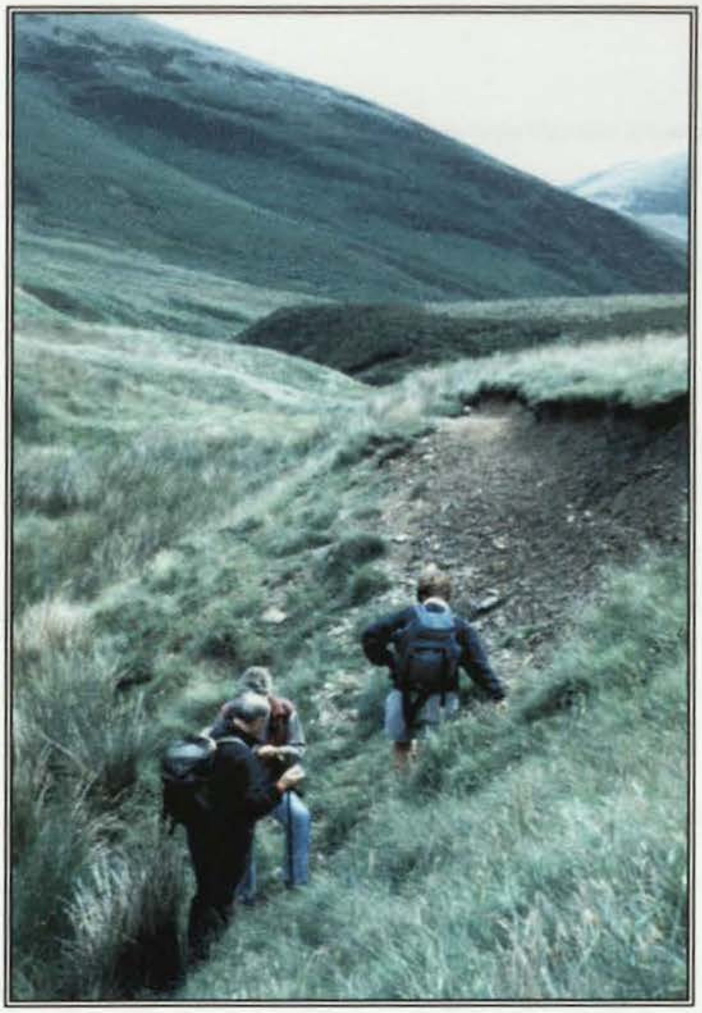


Figure 156: Clashpock Rig, view downstream

The quarry site at Flint Hill is on the ridge in the centre of the photo, immediately above the circular sheep enclosure. Hopehead Burn runs through the centre of the photograph.

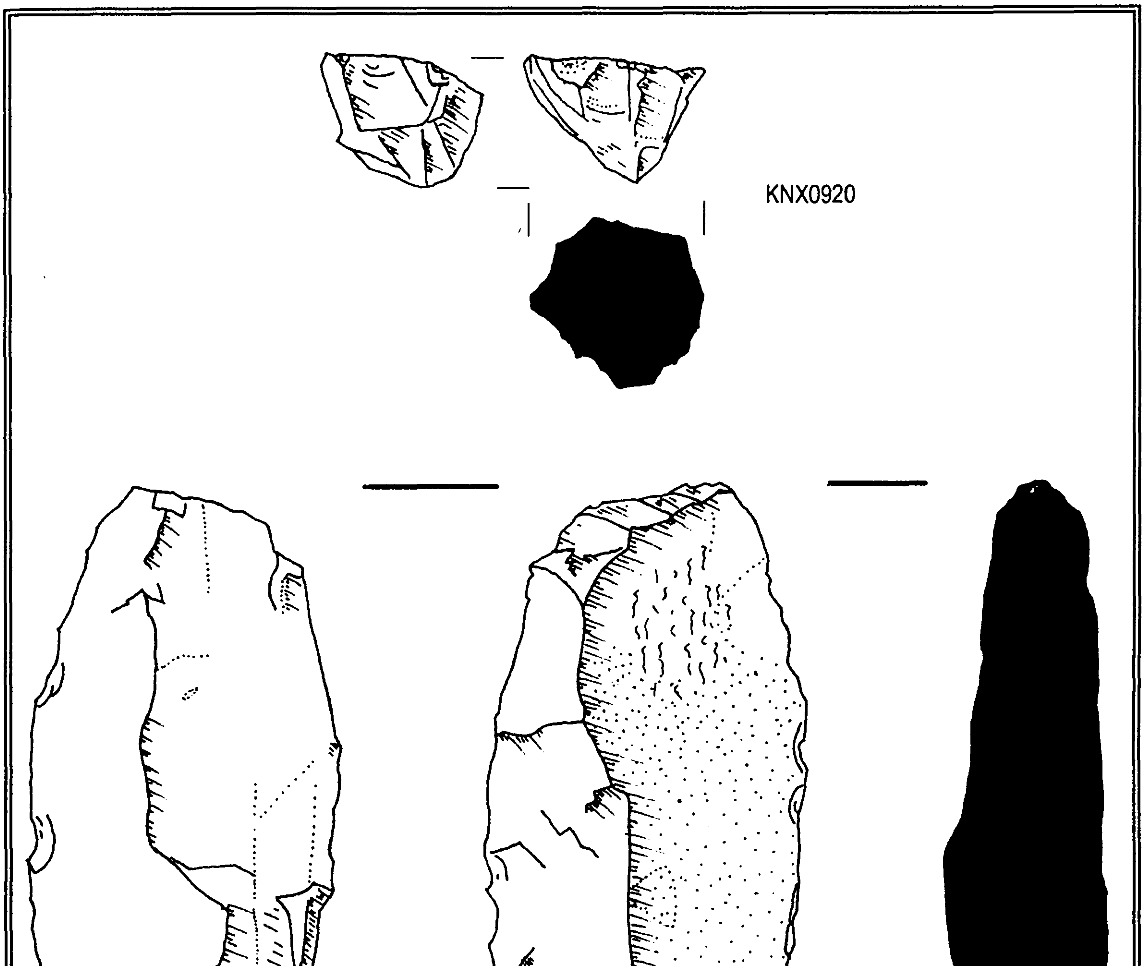


Figure 157: Clashpock Rig: lithics

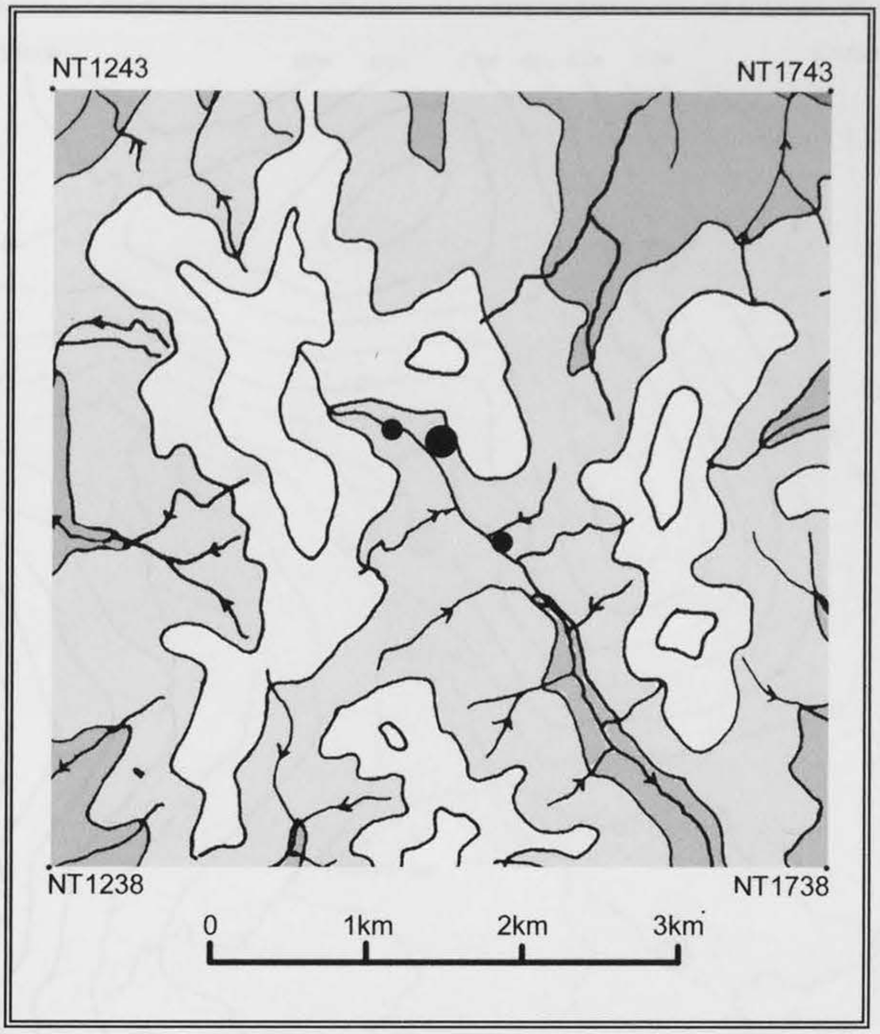


Figure 158: Flint Hill, regional landscape

Flint Hill is marked by the large circle, the smaller black circle to the left is Clashpock rig, to the right the small blade scatter at Stobo Hope Head. See Fig 22 for key

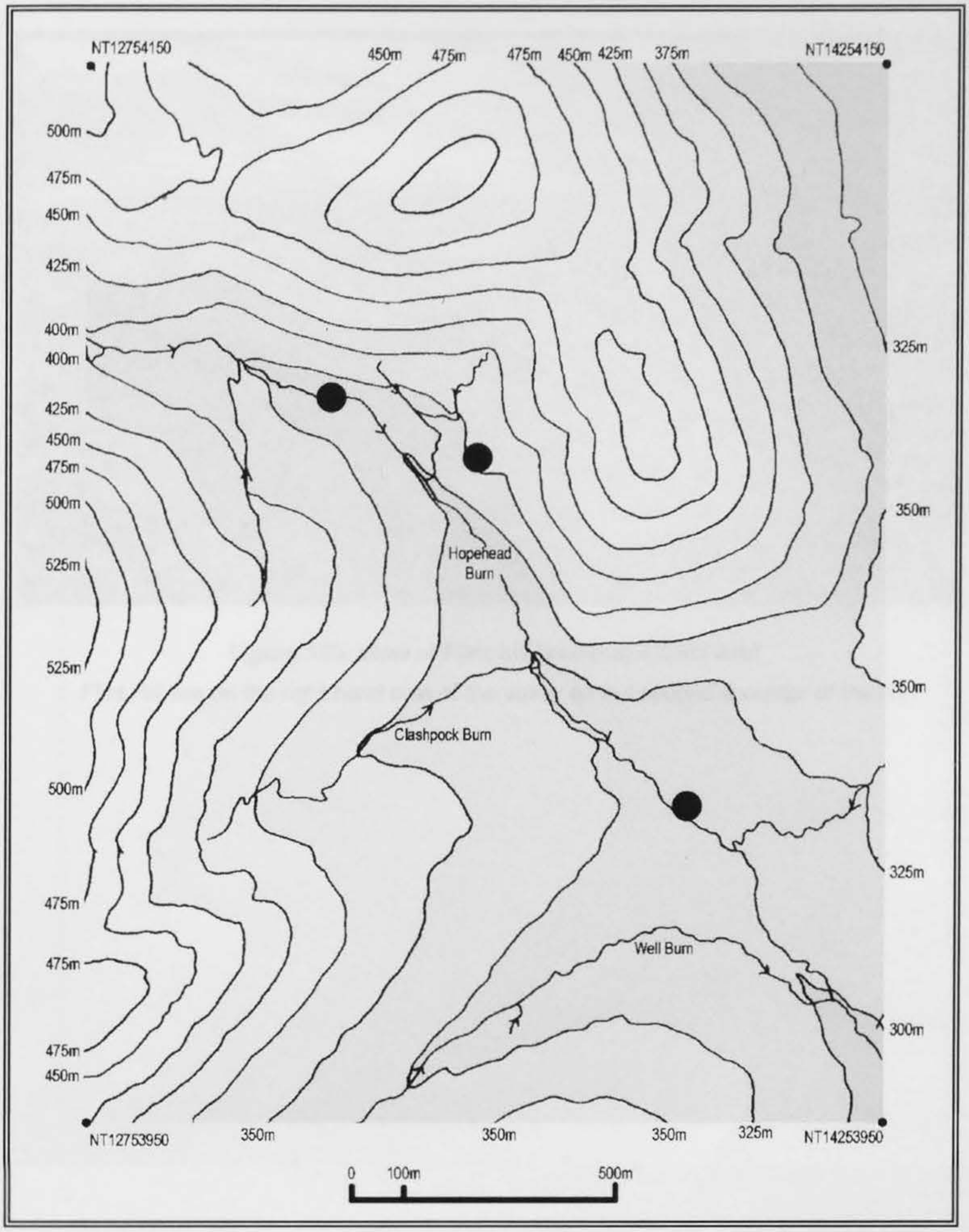


Figure 159: Flint Hill: local landscape

Flint Hill is marked by the middle circle, the circle to the left is Clashpock Rig, downstream to the right the small blade scatter at Stobo Hope Head. See Fig 22 for key

Figure 160: view of Flint hill landscape from east

Flint Hill lies on the right hand side of the valley on the second shoulder of the hill

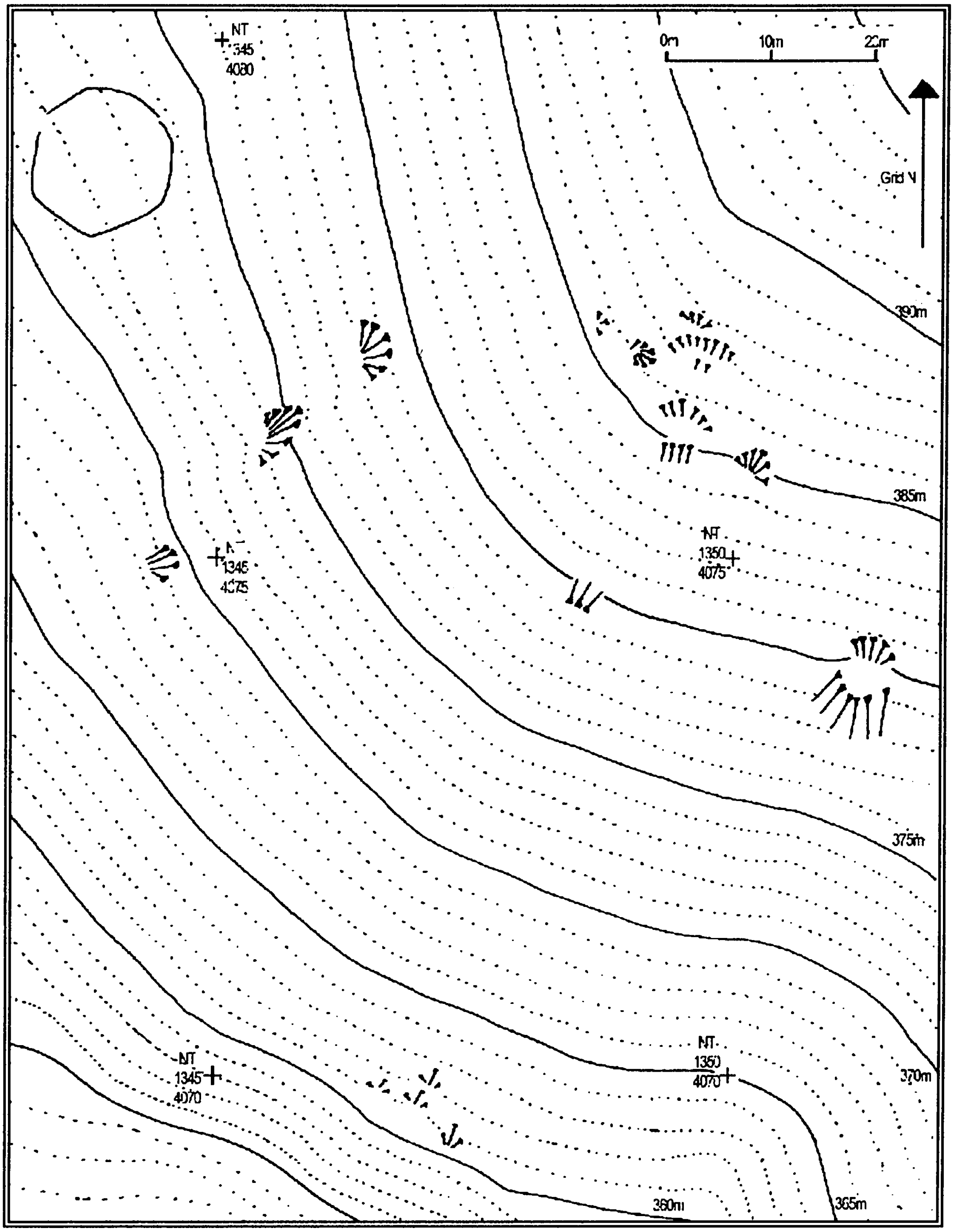


Figure 161: Plan of features at Flint Hill

Figure 162: larger scooped feature at Flint Hill

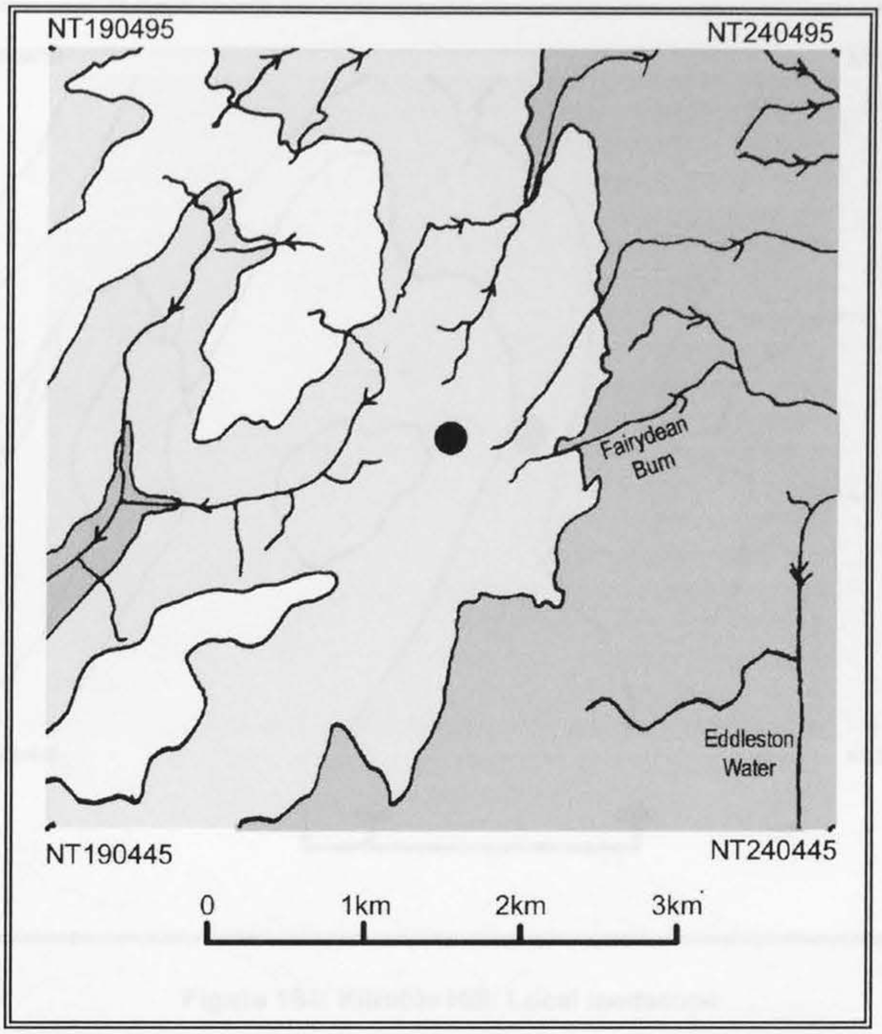


Figure 163: Kilrubie Hill: regional landscape

For key see Fig 22

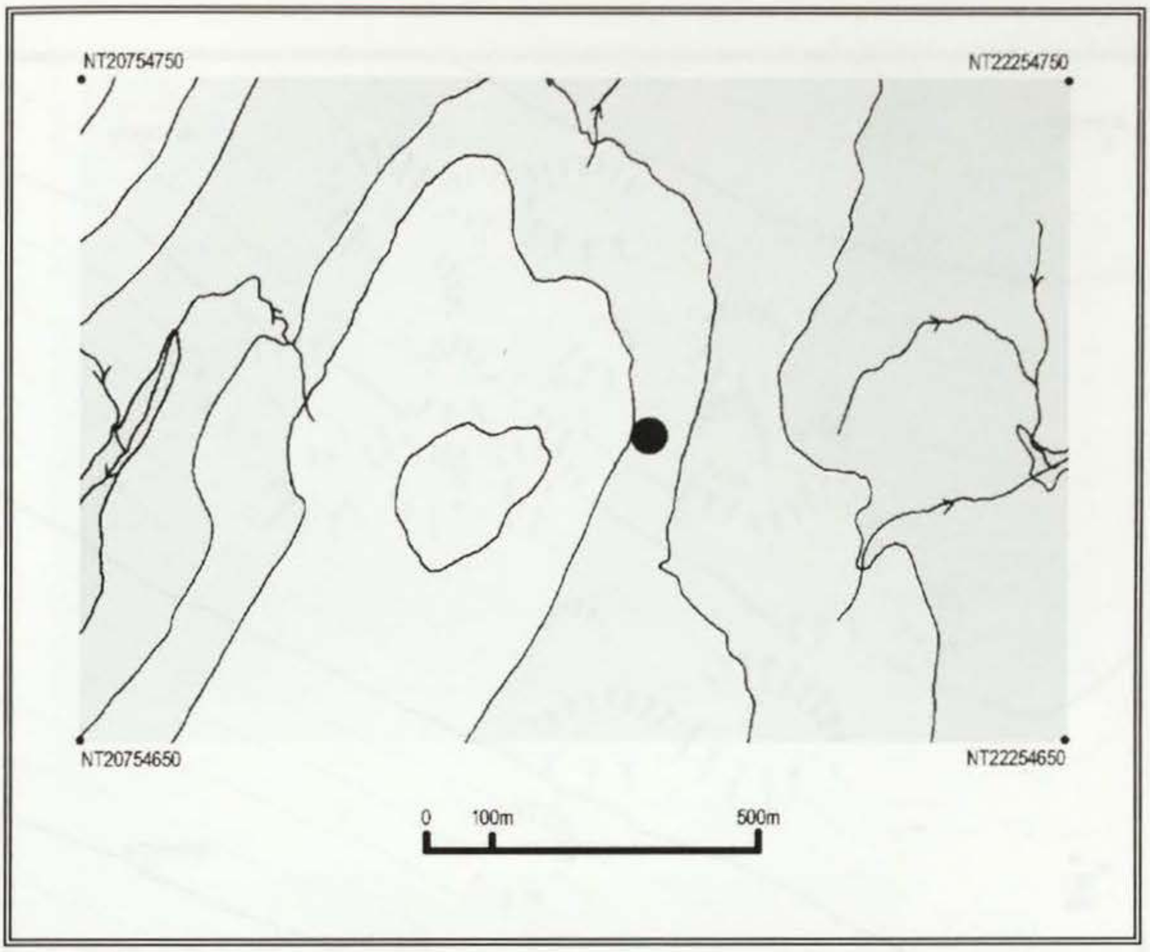


Figure 164: Kilrubie Hill: Local landscape (for key see Fig 22)

Figure 165: Kilrubie Hill: view to site from southeast

The site lies immediately to the left of the woods and beyond the dyke.

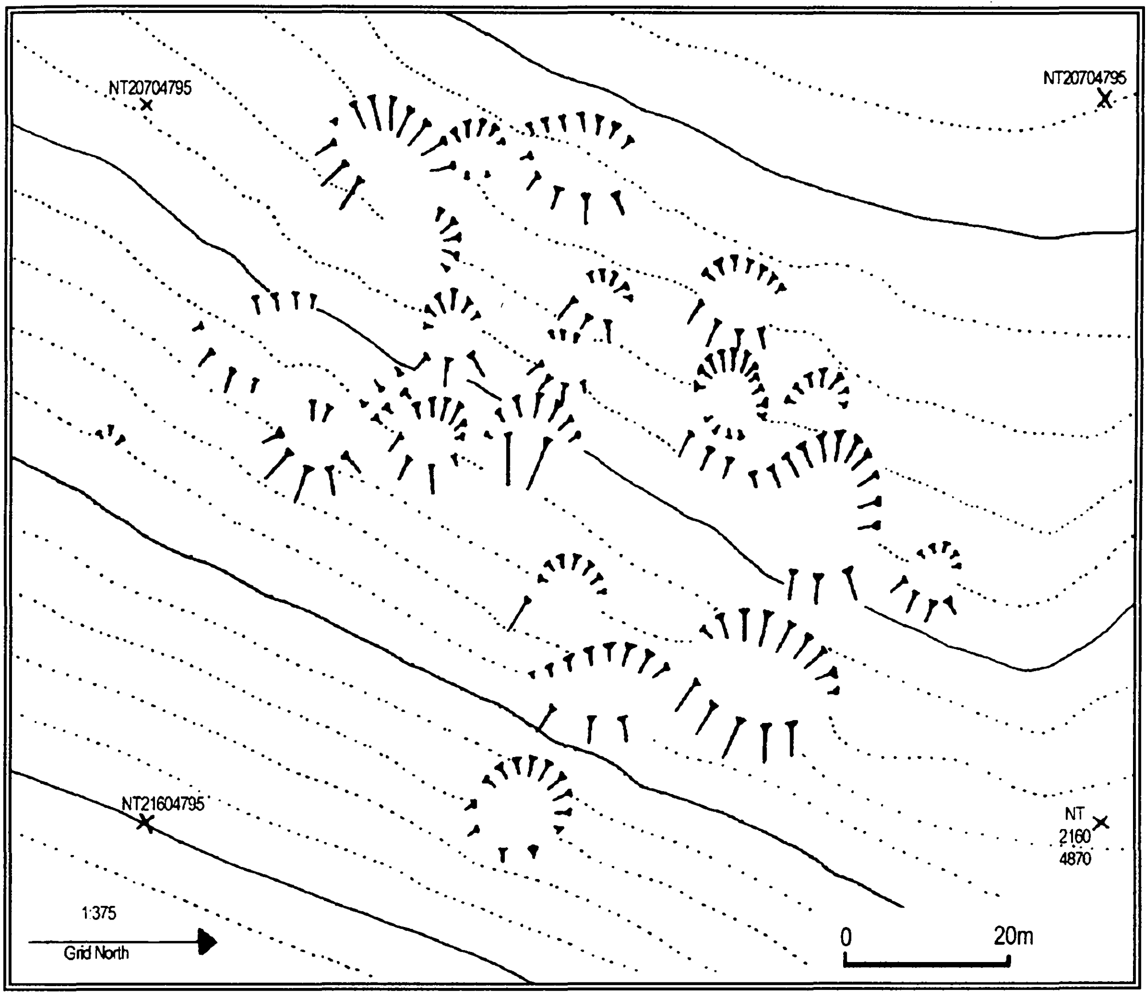


Figure 166: Kilrubie Hill, plan of features

Figure 167: Kilrubie Hill, quarry scoop

View is across Eddleston valley to east/northeast

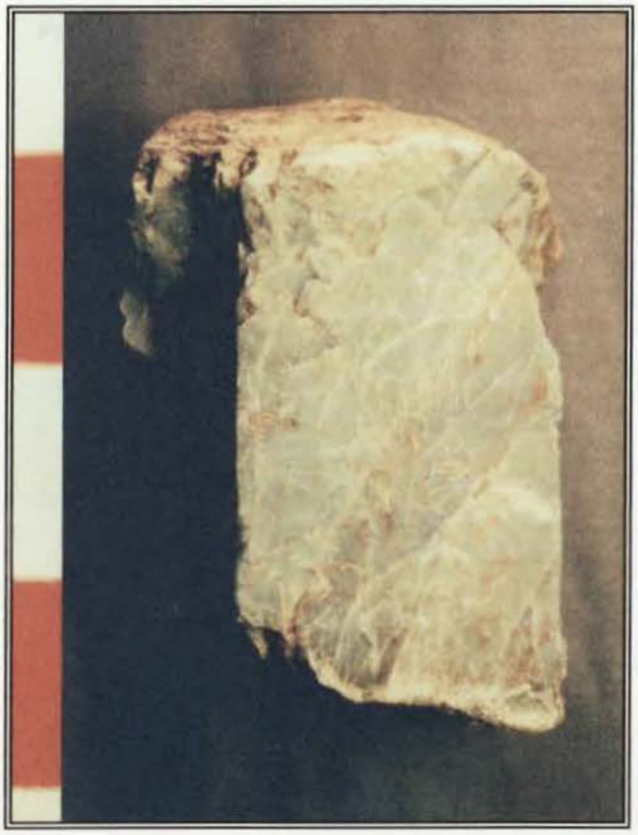


Figure 168: Kilrubie Hill: chert (scale in 5cm intervals)

Figure 169: Kilrubie Hill, exposure of chert

Scale in 5cm divisions

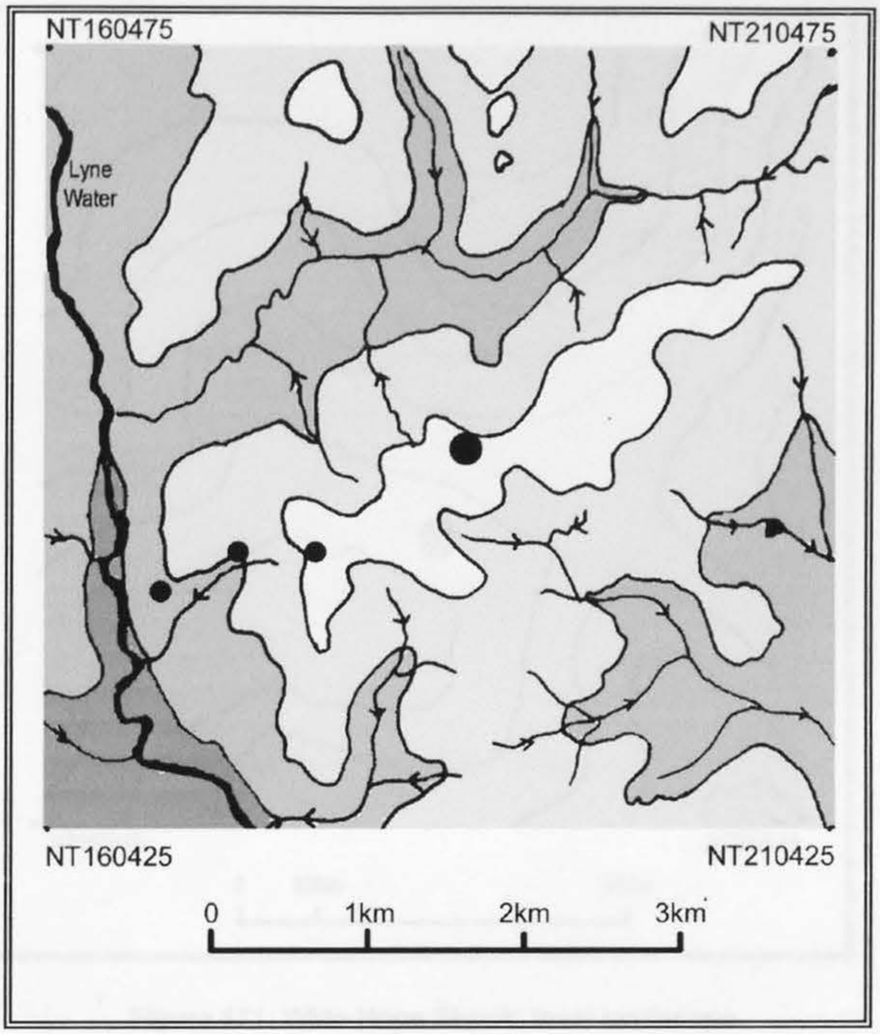


Figure 170: Wide Hope Shank: regional landscape

Smaller black dots to right are finds of flakes near chert outcrops (App. 1) For key see Fig 22

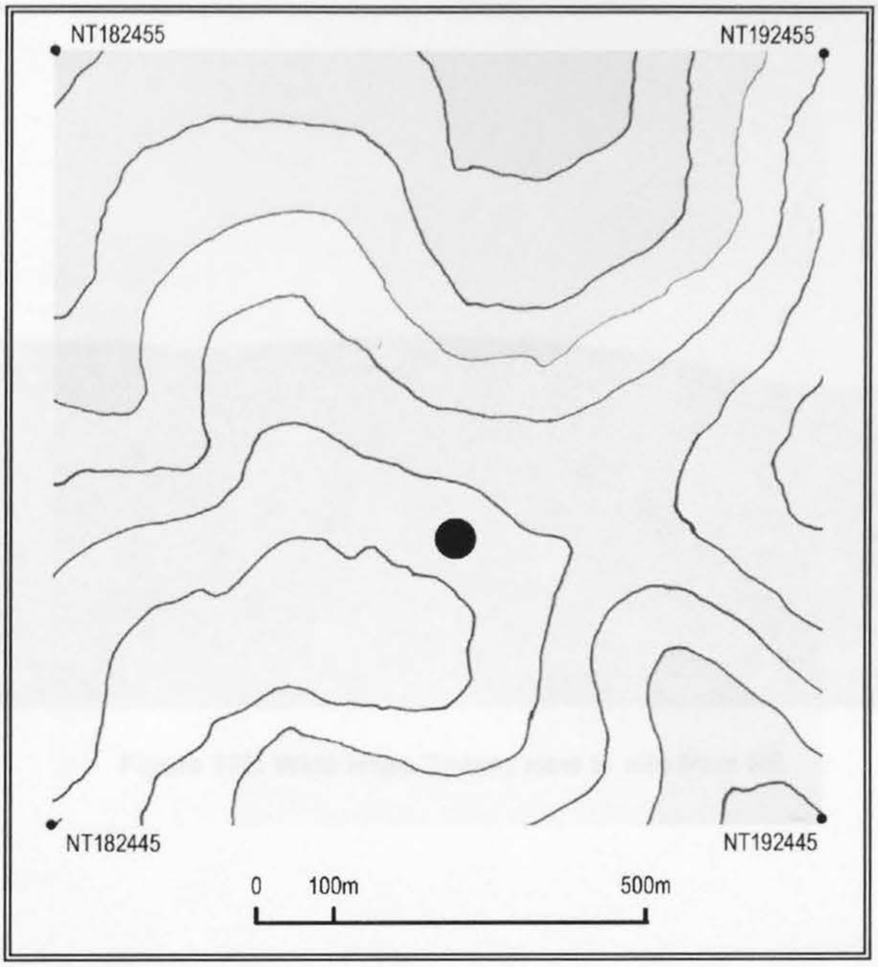


Figure 171: Wide Hope Shank: local landscape

(for key see Fig 22)

Figure 172: Wide Hope Shank: view to site from NE

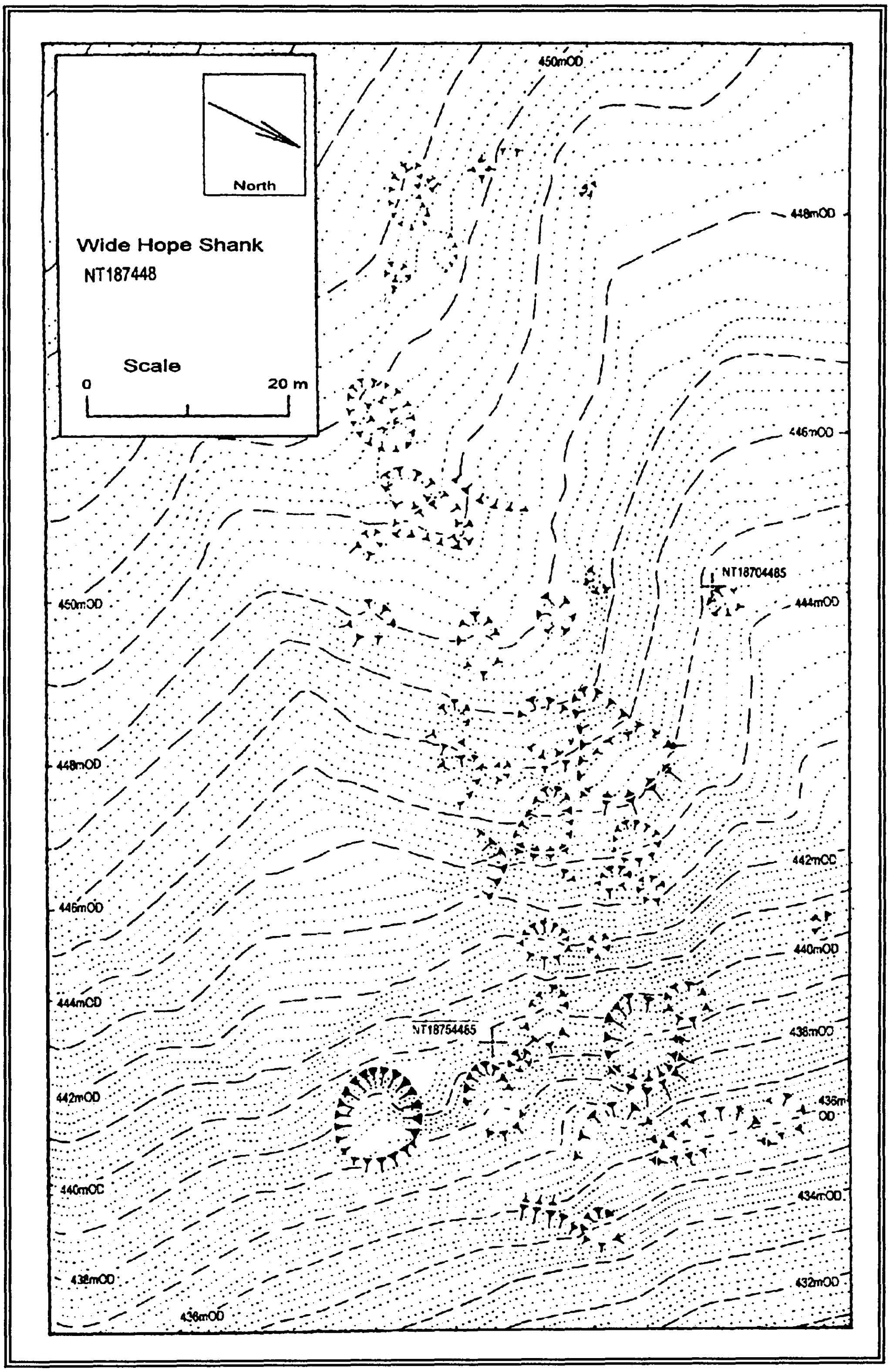


Figure 173: Wide Hope Shank: plan of features

Figure 174: Wide Hope Shank: sheep rub

Figure 175: Wide Hope Shank: excavated feature

All scales @20cm

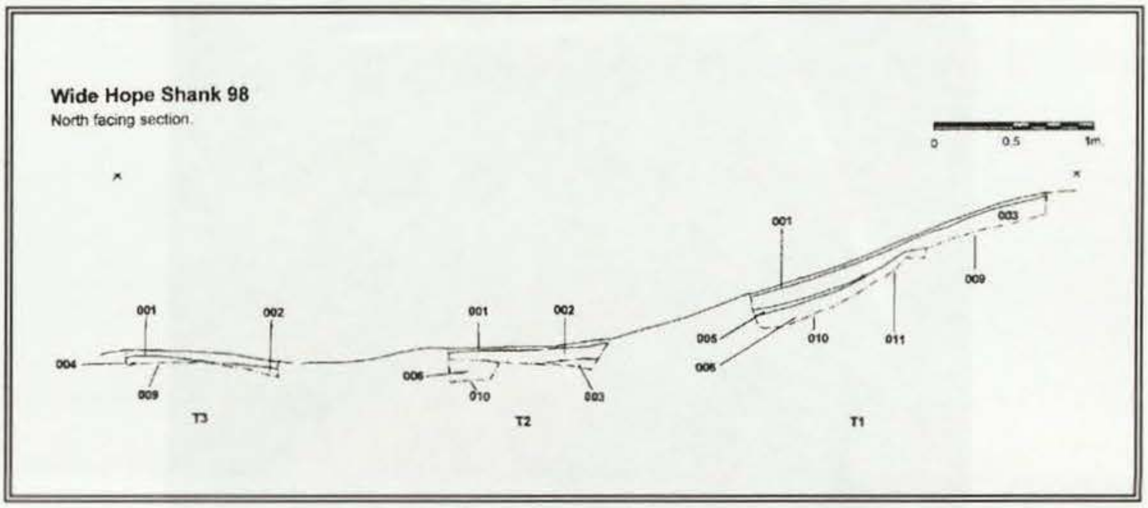


Figure 176: Wide Hope Shank: north facing section

Figure 177: Wide Hope Shank: Trench 1

Looking uphill over cut edge of pit after removal of C.003

Figure 178: Wide Hope Shank: Trench 1

Looking down at box section (S.004)

Figure 179: Wide Hope Shank: Trench 1
detail of north facing section

Figure 180: Wide Hope Shank: section across Trench 1 and Trench 2

Figure 181: Wide Hope Shank: Trench 2 showing box section S.007

Figure 182: Wide Hope Shank: Trench 3

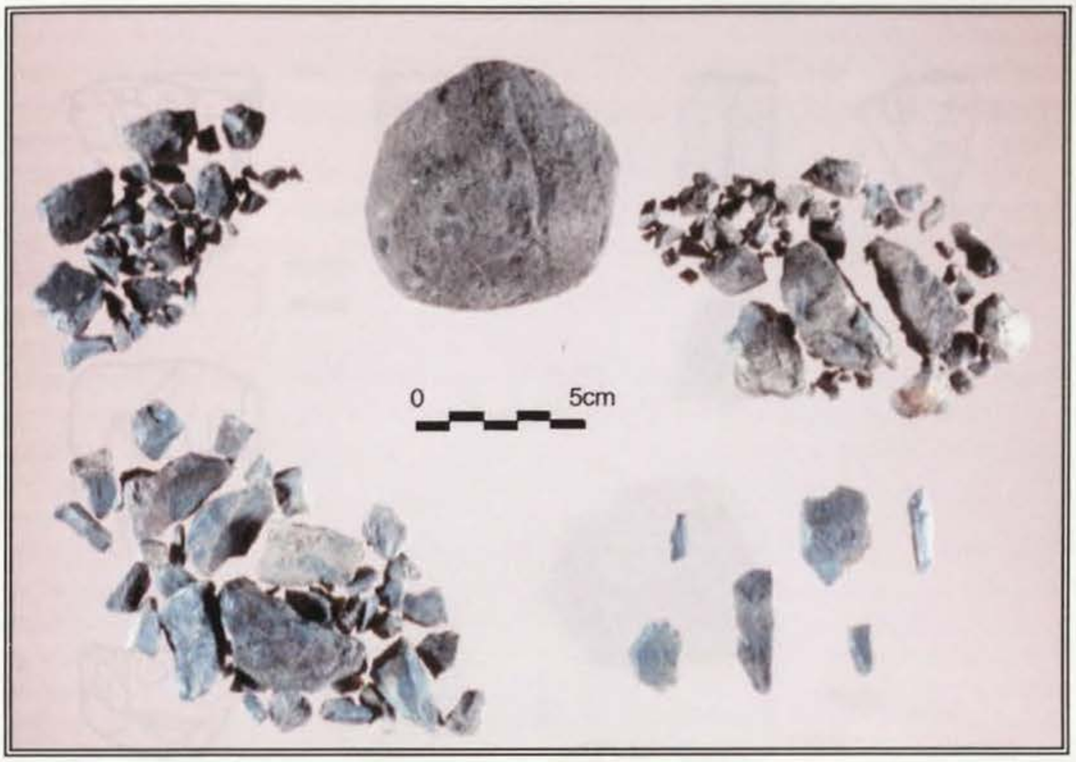


Figure 183: Wide Hope Shank: finds from excavations

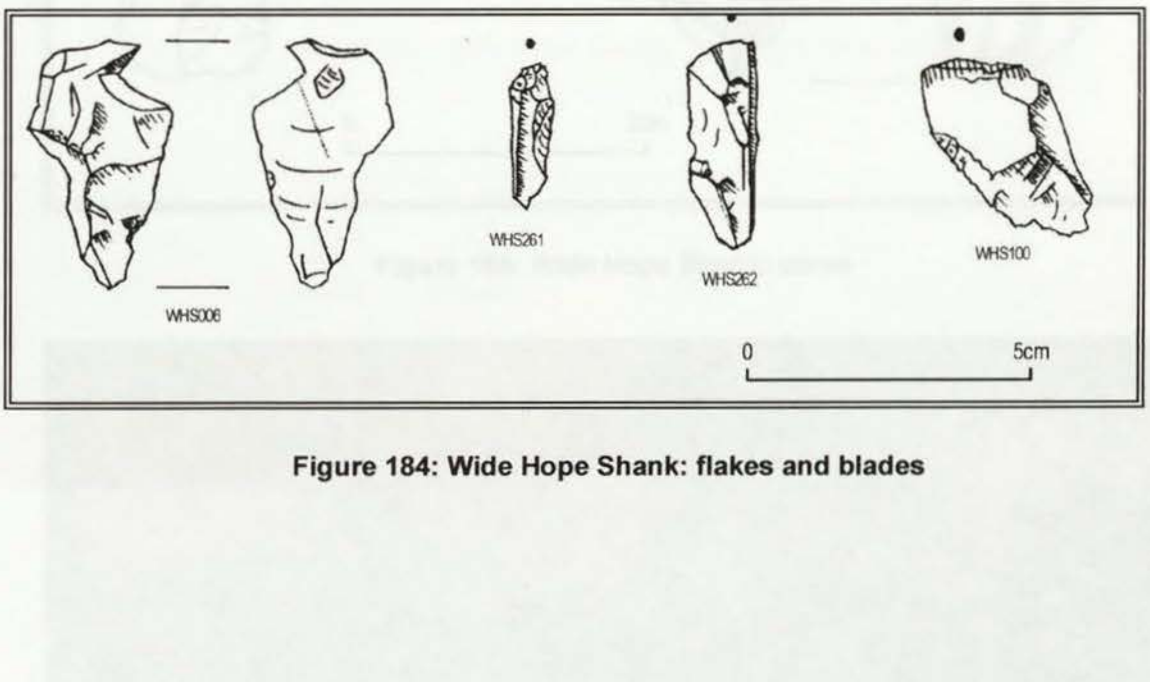


Figure 184: Wide Hope Shank: flakes and blades

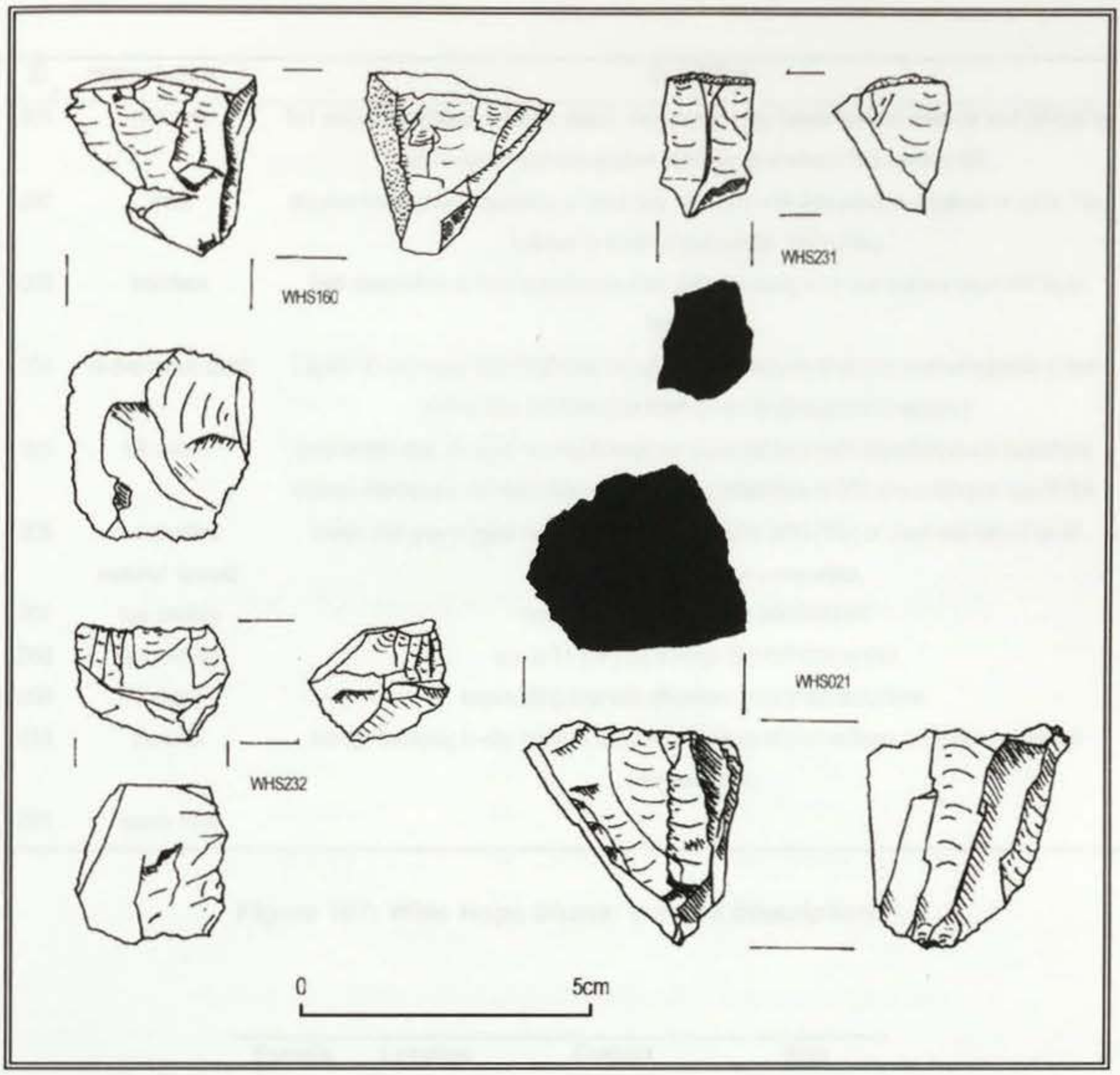


Figure 185: Wide Hope Shank: cores

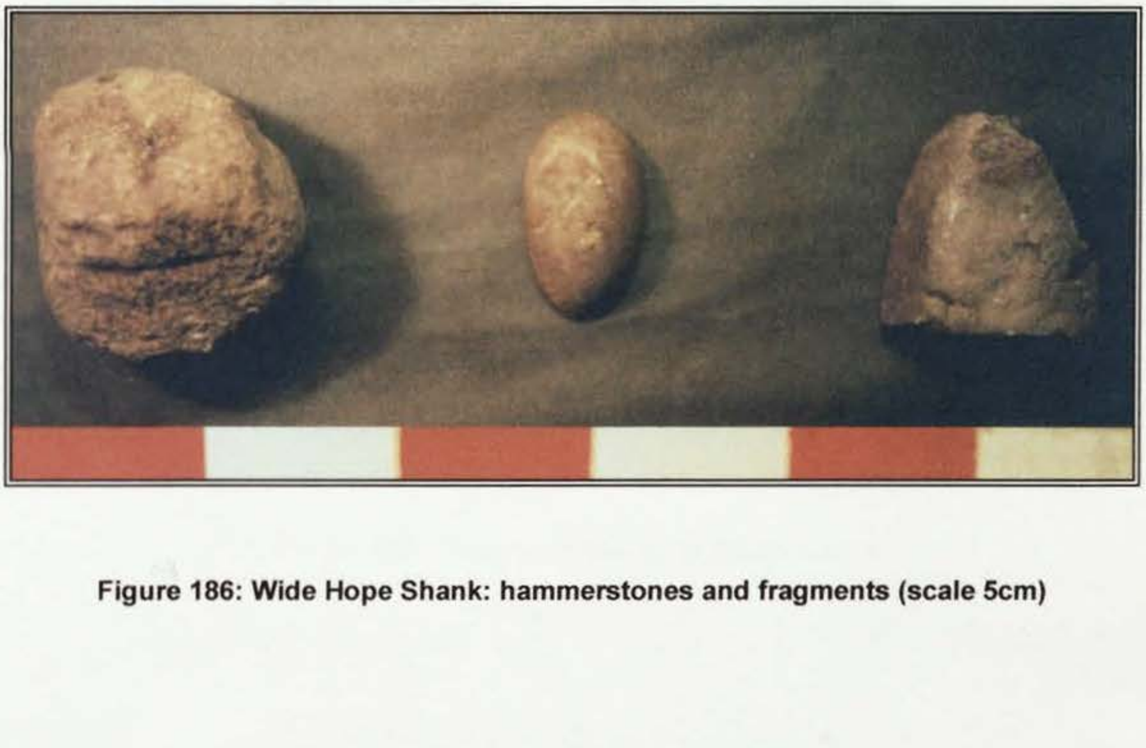


Figure 186: Wide Hope Shank: hammerstones and fragments (scale 5cm)

ID	Interpretations	Description
001	root mat	turf and root mat layer 2-4cm in depth. Very peaty/rooty. Lower horizon irregular and difficult to define due to root penetration. Horizon clear where 001 overlies 002.
002	Peat	discrete homogenous deposits of black silty peat with very little modern organics or roots. Fills hollows in underlying deposits. Stone free.
003	Interface	field description for the complex interface between peaty root mat and the chert rich layer beneath it.
004	re-deposited chert	Layers of very loose chert deposits including large amounts of clearly worked material. Chert varies from weathered to fresh. (Hard to distinguish in section.)
005	hill wash?	grey-brown clay silt layer running throughout chert debitage with abundant stone inclusions. Widens downslope. Hill wash from upslope filling interstices of 004 and settling on top of 006.
006	redeposited material 'upcast'	brown silty-gravel layer incorporating large amounts (c50-75%) of chert with lots of small debitage. Varies greatly in compaction.
007	box section	box in T2 (RK) cut through 004/005/006
008	box section	box in T1 (BF) cut through 004/005/006 to 010
009	Subsoil	brown silt gravel with abundant small chert inclusions.
010	Bedrock	orange decaying in-situ bedrock exposed at bottom of box sections. Irregular surface, no worked chert.
011	'quarry face'	

Figure 187: Wide Hope Shank: context descriptions

Sample	Location	Context	Size
S.001	Tr1 (Upper)	C.003	>5mm
S.002	Tr1 (Lower)	C.003	>5mm
S.003	Tr1 (Upper)	C.003	Total sample
S.004	Tr1 (Lower)	Box section C.008	Total sample
S.005	Tr1 (Lower)	C.003	Total sample
S.006	Tr2	C.003	>5mm
S.007	Tr2	Box section C.007	Total sample
S.008	Tr3	C.003	>5mm

Figure 188: Wide Hope Shank: location of samples, WHS98

>16mm	n	%	<16mm N	%
Bashed Lump	26	3.5%	0	0.0%
Bipolar Core	2	0.3%	1	0.1%
Chunk	483	65.0%	1384	78.7%
Core	5	0.7%	0	0.0%
Flake irreg	203	27.3%	352	20.0%
Flake reg	16	2.2%	19	1.1%
Split Pebble	8	1.1%	2	0.1%
	743		1758	

Figure 189: Wide Hope Shank: composition of assemblage, WHS98

	>16mm		<16mm	
Primary	29	13.4%	12	3.30%
Secondary	163	75.1%	119	32.40%
Tertiary	25	11.5%	236	64.30%
	217		367	

Figure 190: Wide Hope Shank: reduction evidence, WHS98

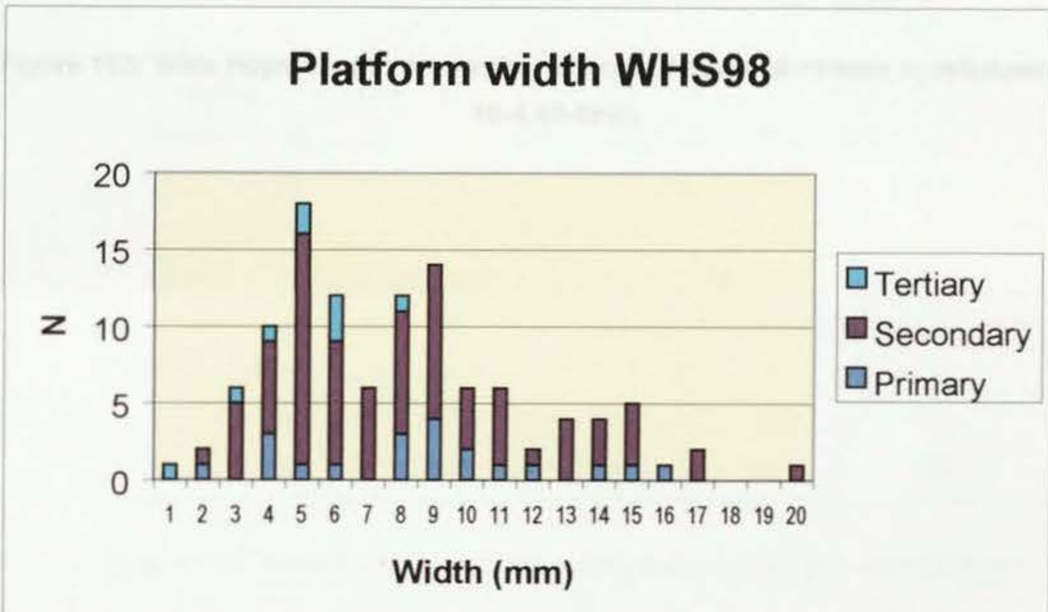


Figure 191: Wide Hope Shank: platform widths

>16mm	S.001	S.002	S.003	S.004	S.005	S.006	S.007	S.008	Total
Worked	22.5%	20.0%	23.8%	17.1%	16.0%	30.9%	15.4%	30.9%	19.7%
Possibly Worked	36.8%	35.3%	22.8%	19.7%	17.5%	30.0%	18.3%	26.7%	24.9%
Probably Natural	18.2%	26.7%	24.8%	38.9%	42.4%	25.7%	43.4%	27.5%	34.0%
Natural	22.5%	18.0%	28.7%	24.3%	24.1%	13.5%	22.9%	14.9%	21.4%
16-4mm, 16-5mm									
Worked	25.9%	23.5%	11.2%	6.0%	10.7%	27.6%	9.8%	23.4%	16.6%
Possibly Worked	25.6%	15.2%	23.7%	9.7%	14.7%	19.8%	12.2%	30.7%	17.0%
Probably Natural and Natural	48.5%	61.3%	65.1%	84.4%	74.6%	52.6%	78.1%	46.0%	66.3%

Figure 192: Wide Hope Shank: proportions of worked material across site, WHS98

	S.001	S.002	S.003	S.004	S.005	S.006	S.007	S.008	Total
worked >16mm	58	164	24	169	82	71	93	81	742
worked 16-4, 16-5mm[1]	153	860	143	958	637	85	540	231	3607
Total	211	1024	167	1127	719	156	633	312	4349
% >16	27.5%	16.0%	14.4%	15.0%	11.4%	45.5%	14.7%	26.0%	17.1%

Figure 193: Wide Hope Shank: proportion of worked material >16mm in relationship to 16-4,16-5mm.

[1] These figures include extrapolated totals for the bulk samples.

>16mm	S.001	S.002	S.003	S.004	S.005	S.006	S.007	S.008	Total
Bashed Lump	3.4%	2.4%	0.0%	2.4%	7.3%	4.2%	4.3%	3.7%	3.5%
Bipolar Core	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	1.1%	0.0%	0.3%
Chunk	56.9%	72.7%	54.2%	63.9%	67.1%	60.6%	58.1%	70.4%	65.0%
Core	0.0%	0.6%	0.0%	0.0%	1.2%	1.4%	2.2%	0.0%	0.7%
Flake irreg	34.5%	22.4%	37.5%	29.0%	22.0%	28.2%	31.2%	25.9%	27.3%
Flake reg	1.7%	1.2%	0.0%	4.1%	1.2%	2.8%	3.2%	0.0%	2.2%
Split Pebble	3.4%	0.0%	8.3%	0.6%	1.2%	2.8%	0.0%	0.0%	1.1%
N	58	165	24	169	82	71	93	81	
16-4mm									
Bashed Lump	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bipolar Core	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Chunk	64.7%	89.7%	61.8%	68.5%	73.5%	71.8%	56.4%	76.6%	78.7%
Core	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Flake irreg	33.3%	9.8%	35.3%	30.4%	24.5%	25.9%	39.8%	22.9%	20.0%
Flake reg	1.3%	0.5%	2.9%	1.1%	1.0%	2.4%	3.8%	0.4%	1.1%
Split Pebble	0.7%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%	0.1%
N									

Figure 194: Wide Hope Shank: composition of samples

>16mm	S.001	S.002	S.003	S.004	S.005	S.006	S.007	S.008	All
Primary	19	10.8	11.1	10.7	31.6	22.7	9.4		13.4
Secondary	76.2	78.4	88.9	80.4	57.9	59.1	78.1	76.2	75.1
Tertiary	4.8	10.8		8.9	10.5	18.2	12.5	23.8	11.5
(n)	21	37	9	56	19	22	32	21	217
16-4mm	S.001	S.002	S.003	S.004	S.005	S.006	S.007	S.008	All
Primary	5.7	4.8	2.6	3.4	3.8			3.7	3.3
Secondary	49.1	34.5	35.9	21.4	11.5	41.7	24.1	29.6	32.4
Tertiary	45.3	60.7	61.5	72.4	84.6	58.3	75.9	66.7	64.3
(n)	53	84	39	29	26	24	58	54	367

Figure 195: Wide Hope Shank: reduction evidence by sample, WHS98

	S.001	S.002	S.003	S.004	S.005	S.006	S.007	S.008	All
Condition									
Abraded	8%	6.7%	18.2%	1.6%				4.2%	3.5%
Burnt		2.2%		1.6%		3.6%	2.6%	4.2%	1.9%
Fresh	92%	91.1%	81.1%	96.7%	100.0%	96.4%	97.4%	91.6%	94.6%
Broken									
Yes	8%			6.6%	3.7%	3.6%	17.9%	12.3%	6.9
Indet.		11.1%		6.6%	11.1%	10.7%	5.1%	8.5%	7.3
No	92%	88.9%	100%	86.9%	85.2%	85.7%	76.9%	79.2%	85.8
E-Dam									
No	32%	22.2%	27.3%	29.5%	7.4%	21.4%	25.6%	33.3%	25
Yes	68%	77.8%	72.7%	70.5%	92.6%	78.6%	74.4%	66.6%	75
(n)	25	45	11	61	27	28	39	24	260

Figure 196: Wide Hope Shank: condition of artefacts by sample, WHS98

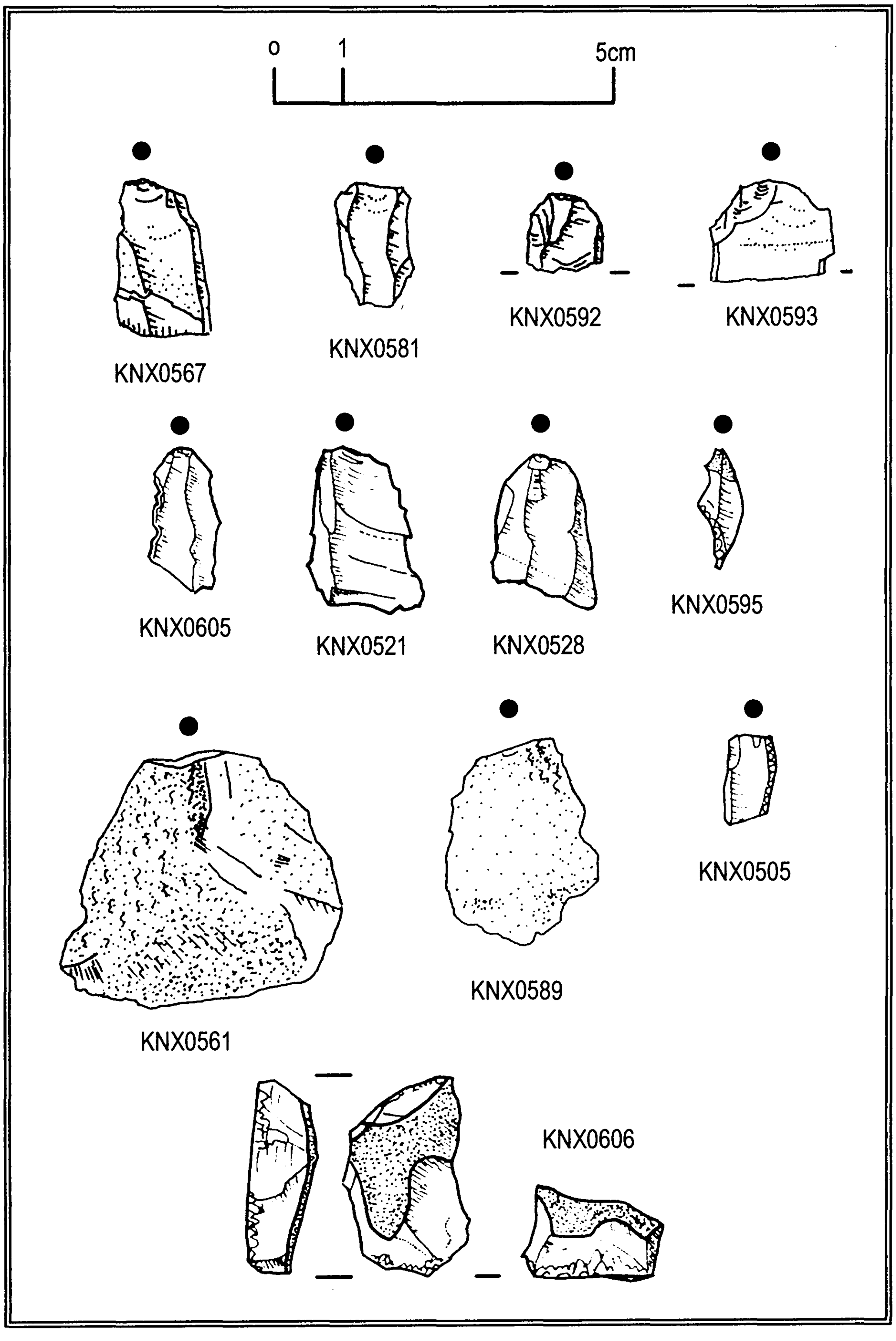


Figure 197: Cavalry Park: surface lithics from Knox collections (1)

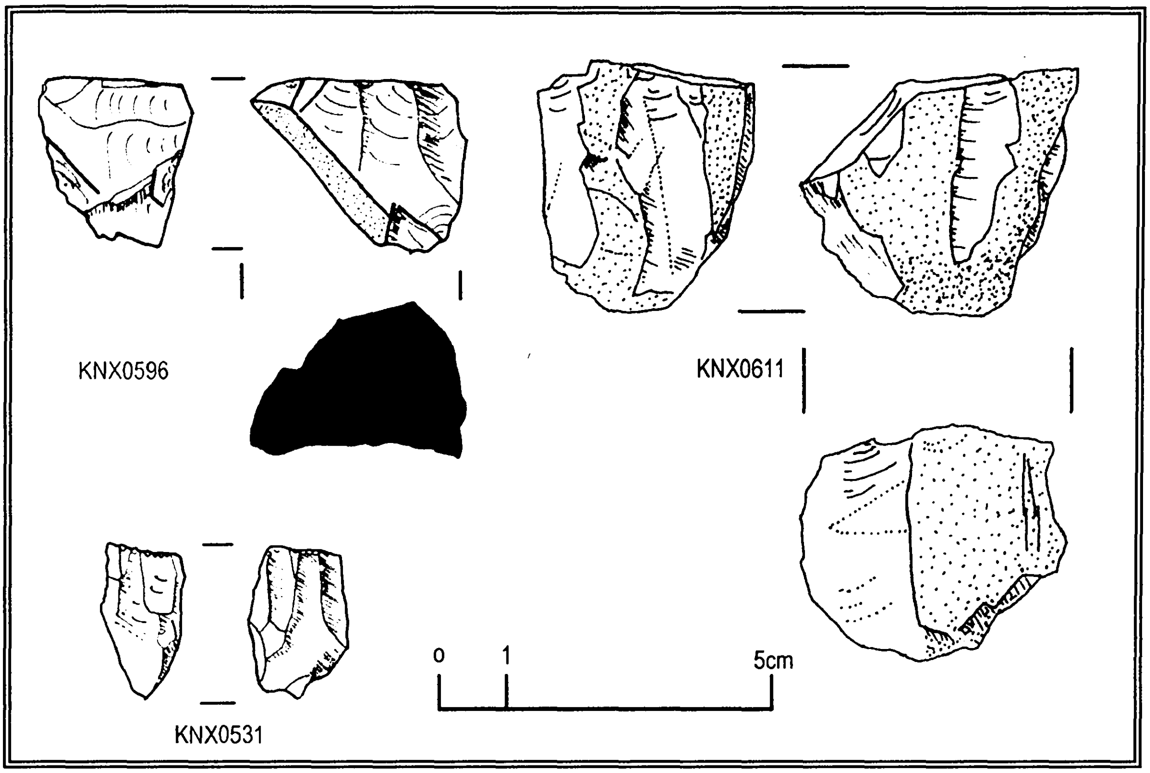


Figure 198: Cavalry Park: surface lithics from Knox collections (2)

Blank	N	%
Bashed Lump	**8**	**5.5**
Blade	**16**	**11**
Chunk	**27**	**18.5**
Core	**20**	**13.7**
Flake Irregular	**40**	**27.4**
Flake Regular	**33**	**22.6**
Unk	**2**	**1.3**
Total	**146**	

Figure 199: Cavalry Park: composition of assemblage

(Unk: KNX576, unusual rolled flint artefact and KNX534, a highly rolled possible concave scraper.)

	Platform Preparation			Platform Width (mm)							
	None	Simple	Complex	1	2	3	4	5	6	9	10
Blade	1	7	6	13		1					
Flake Regular	4	15	4	5	4	4		5	1	2	1
Flake Irregular	5	8	2	3	2		2	2	1		

Figure 200: Cavalry Park: Platform Preparation

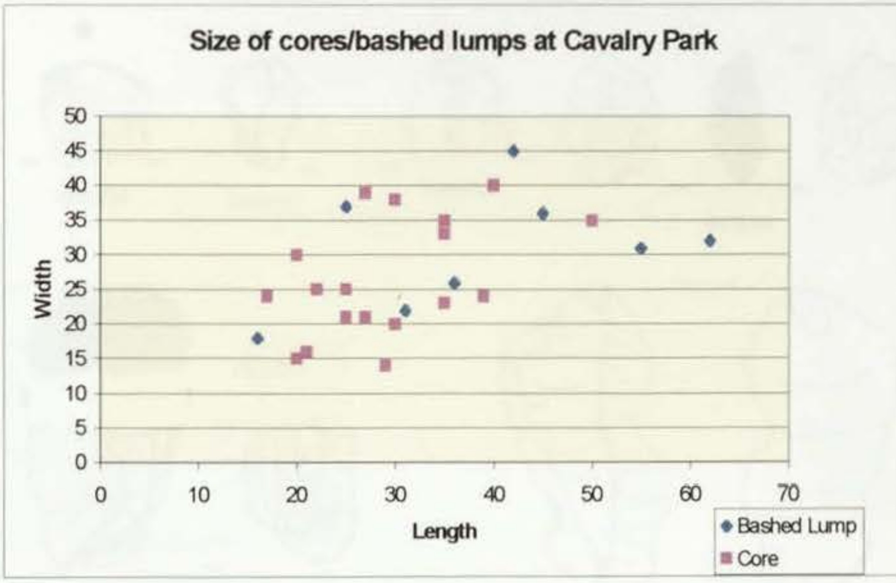


Figure 201: Cavalry Park: size of cores/bashed lumps

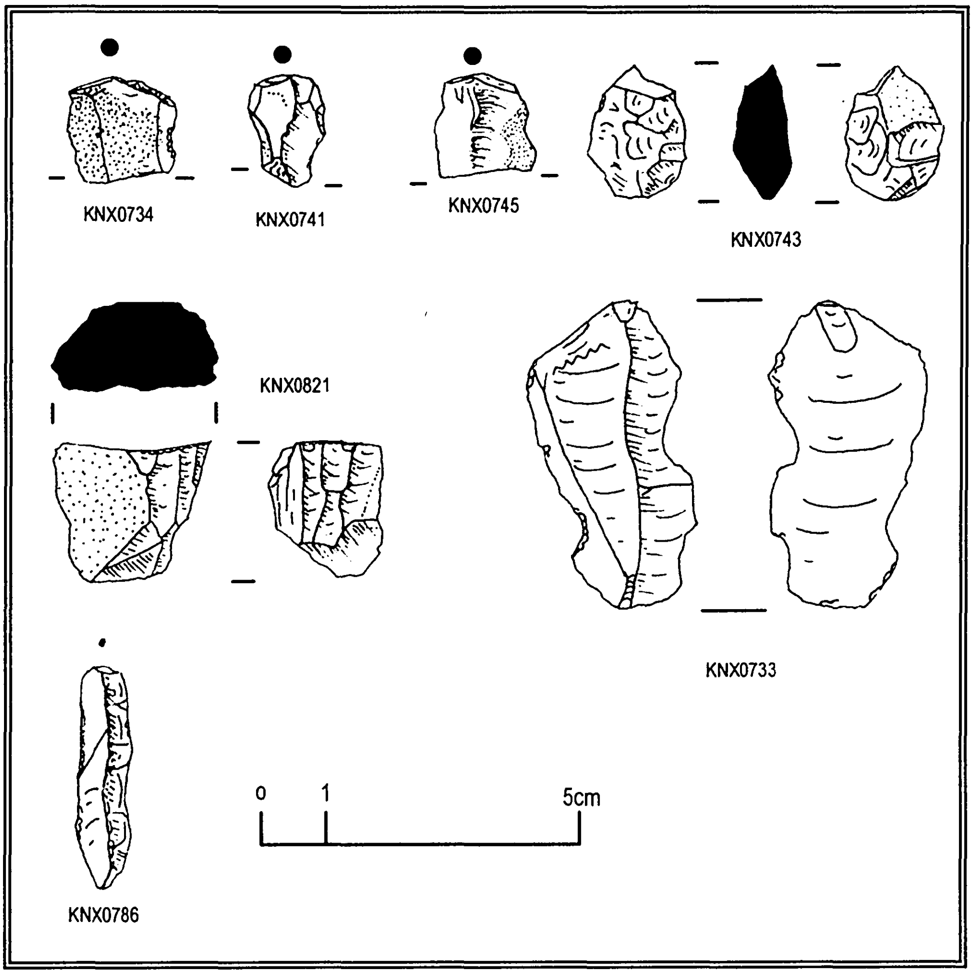


Figure 202: Kingsmuir: surface lithics from Knox collections

Blank	N	%	Agate	Chert	Flint	Pitchstone
Bashed Lump	5	6.8%	2	3		
Bipolar Core	1	1.4%		1		
Blade	5	6.8%		2	2	1
Chunk	17	23.3%		15		2
Core	3	4.1%	1	2		
Flake Irreg	16	21.9%		14	2	
Flake Reg	25	34.2%		20	4	1
Pebble	1	1.4%	1			
Total	73		4	57	8	4

Figure 203: Kingsmuir: composition of the assemblage

	1	2	3	4	5	7	8
Blade	2		1		2		
Flake I	1			1		1	
Flake R	2	1	2	4	3	1	1

Figure 204: Kingsmuir: platform widths (mm)

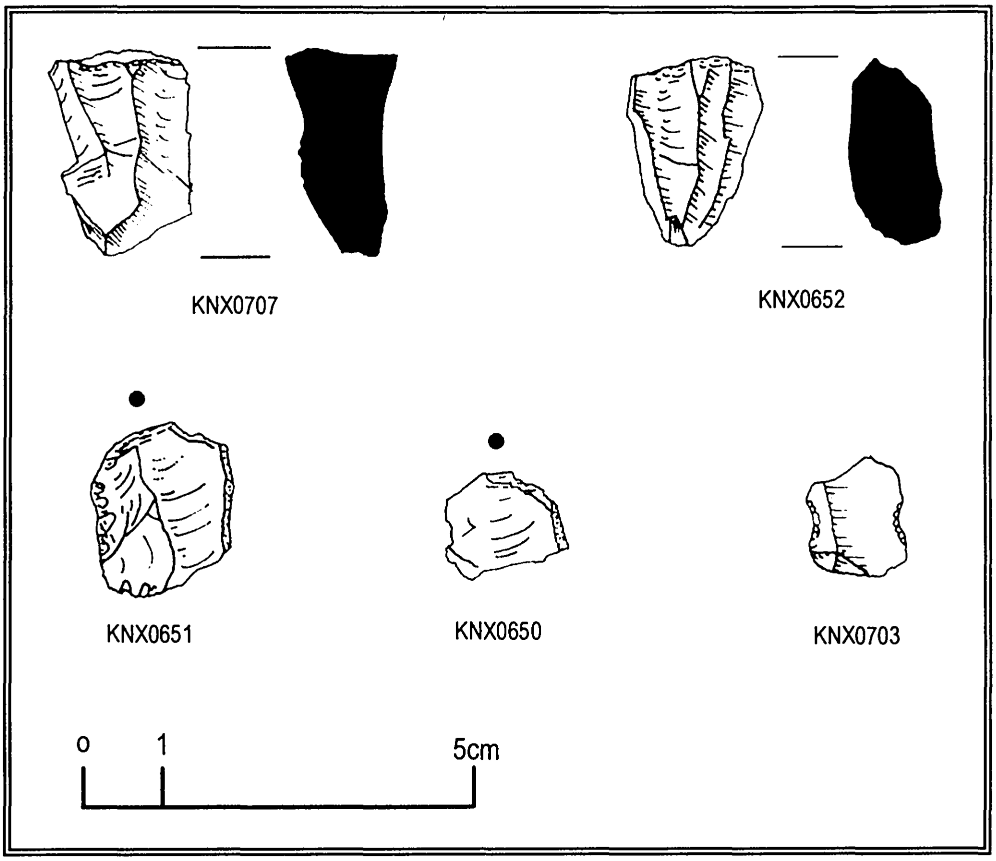


Figure 205: Ferniehaugh: surface lithics from Knox collections

Blank	N	%
Bashed Lump	3	4.2%
Bi-Polar core	1	1.4%
Blade	6	8.5%
Chunk	12	16.9%
Core	10	14.1%
Flake	18	25.4%
Irregular Flake	19	26.8%
Pebble	2	2.8%
	71	

Figure 206: Composition of assemblage at Ferniehaugh

Figure 207: Arran Pitchstone from varied Tweed Valley Sites:
surface finds, W Elliot. Findspots unknown except top right (Ashkirk) bottom right (South Common)

Site Name	NGR	M	N	B	N	Type	Ref
Ancrum (Aucrum?)	?				1	Nodule	Thorpe & Thorpe 1984: 'HM finds'
Ashkirk	?				1	Core	Elliot Collections
Bedrule	? NT 6018		X	X	2	Blades	Thorpe & Thorpe 1984: 'HM finds'
Cavers, Ruberslaw	?				1	Scraper	Ward 1999. NMAS: AB1356
Channelkirk, Carfrae	?				1	Flake, utilised	Thorpe & Thorpe 1984: 'HM finds'
Channelkirk, Oxton, Airhouse	?	X	X	X	3	Blade, Flake	Ward 1999. NMAS: BMA705, 775, 897
Clackmae, Melrose	NT5638	X	X	X	1	Chip	Thorpe & Thorpe 1984: 'HM finds'
Cowdenknowe, Earlston	NT5837	X	?	?	1	Chip (pitchstone or obsidian)	Thorpe & Thorpe 1984: 'HM finds'
Craigsford	NT5738	X	X	X	1	Flake	Ward 1999. NMAS: ABA201
Crumhaugh Hill	NT4813				High	Unk	Mulholland 1970; 86
Denholm, Cavers	NT5618	X	X	X	5	Artifacts	Thorpe & Thorpe 1984: 'HM finds'
Dryburgh Mains	NT5932	X	X	X	3	Flake, Blade x2	Ward 1999. NMAS: BMB 399, 416, 714
Dryburgh	NT5932	X	X	X	1	Scraper	Thorpe & Thorpe 1984: 'HM finds'
Dryburgh, Orchard Field		X	X	X	7	Chips	Thorpe & Thorpe 1984: 'HM finds'
Dryburgh, Riverside Field		X	X	X	3	Flakes	Thorpe & Thorpe 1984: 'HM finds'
Dyke, Cavers					1	Flake	Thorpe & Thorpe 1984: 'HM finds'
Earlston	NT575385	X	X	X	6	Flake	Ward 1999. NMAS: BMA949, 2723,
Earlston, Peebles	??				4	Flake	Ward 1999. NMAS: Unregistered: CS 012/14
Faimington	NT645380	X	X		1	Flake	Thorpe & Thorpe 1984: 'HM finds'
Femiehaugh	NT267398	?	?		1	Blade	Knox collections
Frogden, Linton	?NT76328 2		X	X	1	Flake	Thorpe & Thorpe 1984: 'HM finds'
Gatehousecote, Bedrule	?				3	Core x2, 'knife'	Thorpe & Thorpe 1984: 'HM finds'
Greenlaw, Haliburton	?NT7146				10	Flakes x8, Chips x2	Thorpe & Thorpe 1984: 'HM finds'
Hobkirk, Hawthomside	?				2	Chips	Thorpe & Thorpe 1984: 'HM finds'
Hoselaw, Sprouston	NT805323	X	X	X	3	Artifacts	Thorpe & Thorpe 1984: 'HM finds'
Hume Hall, Hume	NT705414		X	X	1	Chip	Thorpe & Thorpe 1984: 'HM finds'
Kingsmuir, Peebles	NT253393		?		4	Blade x2, chunk x2	Knox collections
Kirkton, Cavers	NT542120				Unk	Cores and Chips	Thorpe & Thorpe 1984: 'HM finds'

Site Name	NGR	M	N	B	N	Type	Ref
Lauder	?				2	Flakes, grey	Thorpe & Thorpe 1984: 'HM finds'
Legerwood, West Morriston	NT587433	X	X	X	1	Flake	Thorpe & Thorpe 1984: 'HM finds'
Merrybrae Enclosure	NT315373				1	Blade	Knox collections
New Graden, Linton	?				1	Flake	Thorpe & Thorpe 1984: 'HM finds'
Newstead	563341	x	X	X	1	Knife	Ward 1999. NMAS: AA211
Peebles	?				8		Ward 1999. NMAS: Unregistered: CS 012/14
Philiphaugh	NT437280	X	X	X	1	Flake	Thorpe & Thorpe 1984: 'HM finds'
Rink	NT485323	X	X	X	1	Flake	Ward 1999. NMAS: AB1569
Roxburghshire	?				17	Artefacts x16, nodule x1	Thorpe & Thorpe 1984: 'HM finds'
Ruberslaw	?NT58015 6		X	X	1	Flake	Ward 1999. NMAS: AB1405
Selkirkshire	?				3	Chips	Thorpe & Thorpe 1984: 'HM finds'
Sherriffmuir	NT201401				2	Core, flake	GW fieldwork
Smedheugh	NT489279		X	X	1	Arrow/Scrape r	Ward 1999. NMAS: BMA1094
South Common, Selkirk	NT4827				1	Core	Elliot Collections
Sprouston, Lurdenlaw	NT755345	X	X		1	Core	Ward 1999. NMAS: BMA2799
Tofts	?				2	Chips	Thorpe & Thorpe 1984: 'HM finds'
Tofts (Lower)	?				4	Chips	Thorpe & Thorpe 1984: 'HM finds'
Tofts (Upper)	?				3	Chips	Thorpe & Thorpe 1984: 'HM finds'
Town O'Rule	?				2	Flakes	Thorpe & Thorpe 1984: 'HM finds'
Tweed Basin	?				Unk	Fragments of pitchstone	Thorpe & Thorpe 1984: 'Piggot 1962'
Whitriggs, Cavers	?				3	2 artefacts and a 'scraper'	Thorpe & Thorpe 1984: 'HM finds'
Yarrow	NT3527	X	X	X	1	Flake	Thorpe & Thorpe 1984: 'HM finds'

Figure 208: Tweed Valley: pitchstone finds and associations
After Thorpe and Thorpe 1984; Ward 1999: with additions

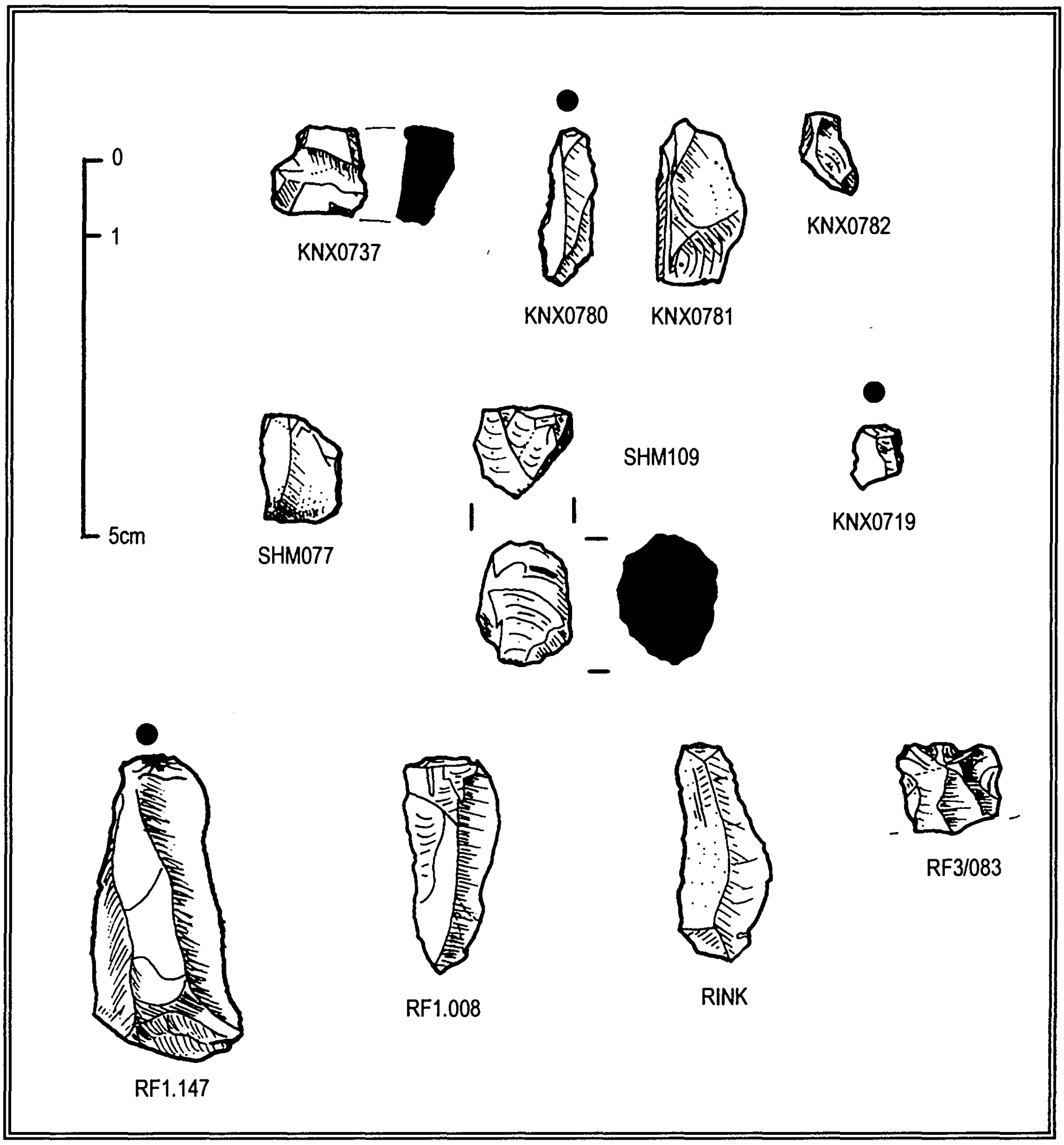


Figure 209: Tweed Valley: pitchstone

Upper row all Kingsmuir, Peebles. Centre Row (l-R) Sheriff Muir, Sherriff Muir, Ferniehaugh. Lower row all Rink Farm

		Chert	Flint	Chalc-edony	Other	N	Colelctor	Source
Dookits	n	123	23		2	148	Knox/Excav	
	%	83.1%	15.5%	0.0%	1.4%			
Manor Bridge	n	710	106	3	8	827	Knox/Excav	
	%	85.9%	12.8%	0.4%	1.0%			
Shiplaw	n	192	9		2	203	Excav	
	%	94.6%	4.4%	0.0%	1.0%			
Cavalry Park	n	141	4		1	146	Knox/Excav	
	%	96.6%	2.7%	0.0%	0.7%			
Kale 1	n	30	52	50	8	140	Forsyth	
	%	21.4%	37.1%	35.7%	5.7%			
Kale 2	n	13	55	40	9	117	Forsyth	
	%	11.1%	47.0%	34.2%	7.7%			
Kale 1& 2 combined	n	43	107	90	17	257	Forsyth	
	%	16.7%	41.6%	35.0%	6.6%			
Kale Elliot	n						Elliot	Wadia 2000
	%	52.0%	32.0%	16.0%				
Edston 2	n	56	2		1	59	Excav	
	%	94.9%	3.4%	0.0%	1.7%			
Rink (excavated sample)	n	117	23	6		146	Excav	
	%	80.1%	15.8%	4.1%	0.0%			
Rink (Haley)	n	Unk	Unk	Unk	Unk	0	Elliot	Haley 1990, only based on complete pieces
	%	72.0%	13.0%	8.0%	7.0%			
Springwood (CWJ)		785	419	1047	28	2279	Excav	Wickham-Jones nd
	%	34.4%	18.4%	45.9%	1.2%			
Dryburgh	n	unk	unk	unk	Unk	0	Elliot	Wadia 2000
	%	59.0%	34.0%	8.0%	1.0%	1.02		
Springwood	n	unk	unk	unk	Unk	Unk	Elliot	Wadia 2000
	%	17.0%	70%	12.0%	1.0%	70.3		

		Chert	Flint	Chalc-edony	Other	N	Colelctor	Source
Springwood	n	19	83	46	2	150	Surface	
	%	12.7%	55.3%	30.7%	1.3%			
Fens	n	147	45	12		204	Munro	
	%	72.1%	22.1%	5.9%	0.0%			

Figure 210: Tweed Valley: overall raw material use on varied sites and samples

Own analyses unless stated otherwise.

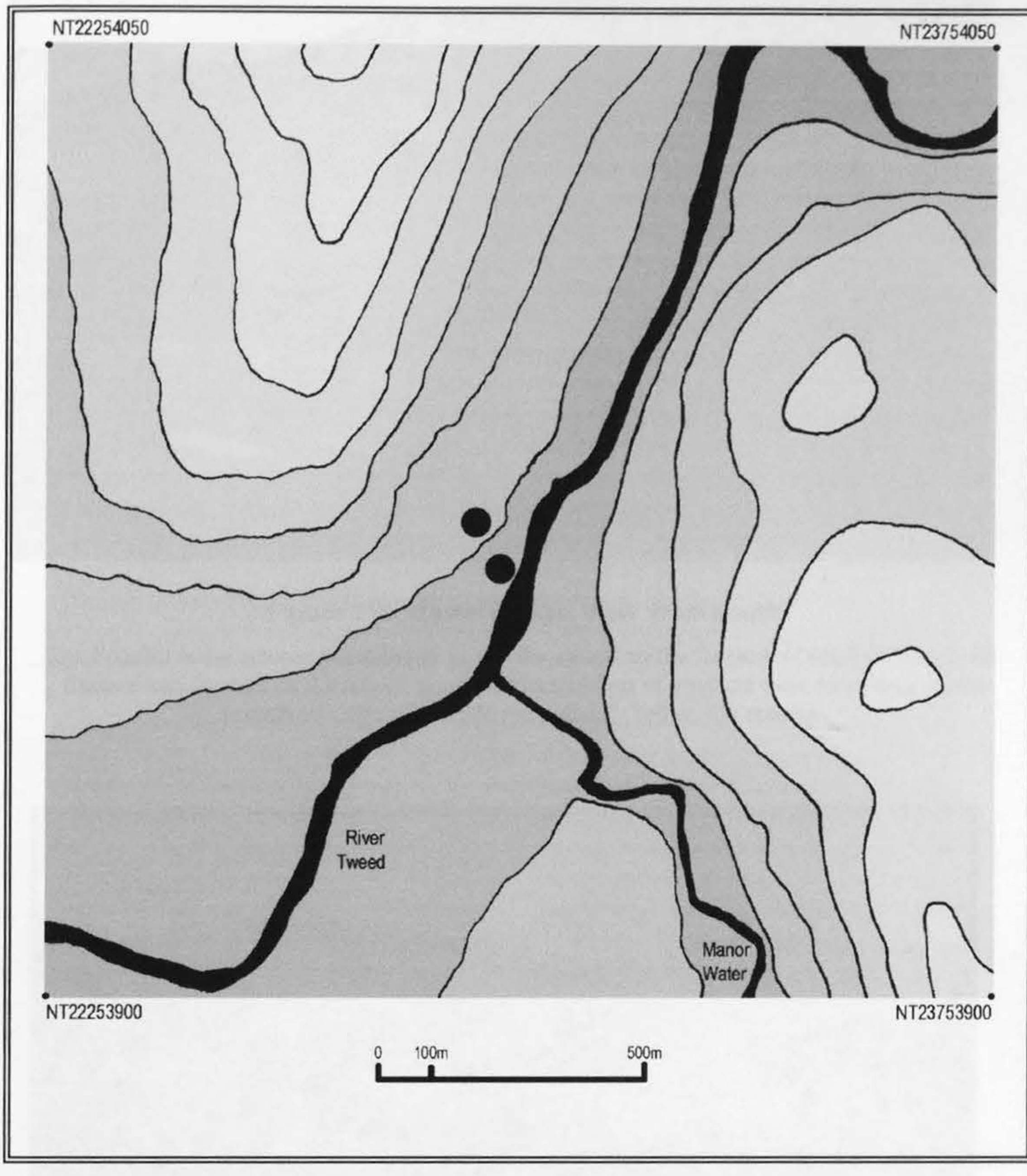


Figure 211: Manor Bridge: local landscape

Dots mark excavated sites on the Manor Bridge 'Cow field' and, closer to the river, the Popples. Finds also made from all sides of the river at the junction. See Fig 22 for key, Fig 23 for regional landscape

Figure 212: Manor Bridge: view from south

The Popples is the outcrop immediately above the Tweed on the far bank (Tweed flowing L-R). Excavations focused on the left-hand end. Concentrations of artefacts were also found on the prominent ridge in the field immediately behind the outcrop.

Figure 213: Manor Bridge: landscape view from south

Popples visible in the bottom right hand corner. Tweed runs through centre of photograph and Manor Water joins it in front of the bridge. Surface finds also made from the trees and rocks opposite the Popples and from the near end of the field beyond the road behind the Popples.

Figure 214: Manor Bridge: detail of west end of Popples

Figure 215: Manor Bridge: view to site from the west

Manor Bridge in centre of photograph, this side of river. Note the row of hills pierced by the Neidpath Gorge in the centre.

Figure 216: Manor Bridge: surface finds from the Popples, Knox collections

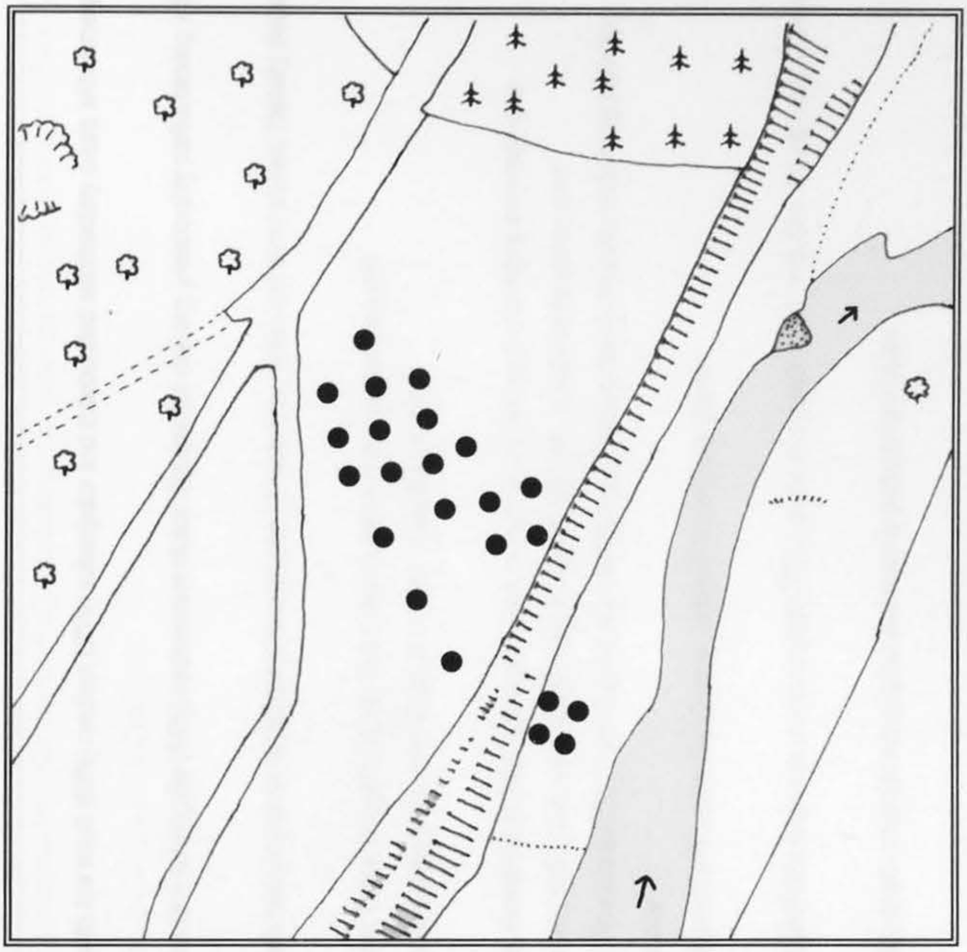


Figure 217: Manor Bridge: location of test pits

Pit Code	*Co-ordinate*	*Pit Code*	*Co-ordinate*
PP1	**10, 1**	**PP12**	**60,-100**
PP2	**10, 7**	**PP13**	**70,-50**
PP3	**20, 1**	**PP14**	**70,-70**
PP4	**20, 7**	**PP15**	**70,-90**
PP5	**20, -30**	**PP16**	**70,-110**
PP6	**30, -50**	**PP17**	**80,-40**
PP7	**40, -71**	**PP18**	**80,-65**
PP8	**50, -90**	**PP19**	**80,-80**
PP9	**60, -40**	**PP20**	**80,-100**
PP10	**60, -60**	**PP21**	**90,-90**
PP11	**60, -80**	**PP22**	**90,-110**

Figure 218: Manor Bridge: test pit codes

Pit ID	Context	Depths	Description
PP1	101	0 to 6cm	root mat: pale brown medium sands
PP1	102	6 to 23cm	light-medium brown with orange loose granular medium sand with few small (80%) medium (20%) subangular and subrounded sedimentary clasts with a merging boundary over
PP1	103	23 to 50-55cm	orange-brown loose granular medium sands with few small - medium subangular (80%) sedimentary clasts. Occasional staining, presumably partial mixing with material from below. Extensive lithics finds.
PP1	104		varied heavily stained medium sands (orange through black) with few natural clasts, but large frequencies of hazel nuts, lithics and burnt stones. Heavily disturbec by burrows and roots with merging boundaries
PP1	105	c55-65cm	medium brown varied sand with large quantities of hazel nuts and lithics. Merges into all other contexts. More homogenous than 104
PP1	106	86 to 96cm	Natural: orange medium sand, loose to firm in texture with very rare small inclusions. Slight pink tinge - possible heating?
PP2	201	0 to 4cm	root mat
PP2	202	4 to 18cm	light brown medium sand with orange. Inorganic loose granular. Few small (100%) sub angular sedimentary clasts. Merged, undulating boundary over
PP2	203	18 to 56cm	medium brown medium sand. Inorganic loose granular. Few small (100%) sub angular sedimentary clasts. Merged, undulating boundary over
PP2	204	56 to 78 cm	dark to medium brown medium sand. Inorganic loose granular. Few small (100%) sub angular sub rounded sedimentary clasts. Merged, undulating boundary over. Also @ c55-60cm layer of large stones. Abrupt boundary over
PP2	205	78 to 83cm	yellow-orange inorganic medium sands. Compacted granular deposit with greater frequencies of small sub angular clasts.
PP2	301	0 to 2-3cm	root mat
PP2	302	2-3 to 12-14cm	grey brown inorganic fine sand. Very dry and loose with few small (70%) and medium sub angular (70%) and subrounded clasts. Including railway slag and coal. Merging boundary over
PP3	303	12-14 to 32-5cm	orange tan inorganic fine-medium sand with few (more than 002) small - medium sub angular and angular sedimentary clasts.
PP3	304	32-5 to 55cm	orange tan inorganic fine-medium sand with moderate medium and small sub angular and angular sedimentary clasts.

Pit ID	Context	Depths	Description
PP3	305	55 to 65cm	orange tan brown with stains and patches fine medium sand. Heavily disturbed. with few small-large rounded clasts . Sever burrows and cavities at c57-60cm. Merged undulating boundary over
PP3	306	65 to 73cm	orange heavily stained and disturbed fine-medium sand with few clasts./ Clear boundary over
PP3	307	73 to 96cm	orange clean natural fine-medium sands
PP4	401	0 to 5cm	turf mat
PP4	402	5 to 20cm	pale brown medium sands. Inorganic loose. Few small sub angular clasts. Sharp boundary over
PP4	403	20 to 38cm	medium brown/orange inorganic medium loose sand. Few sm-med varied clasts. Abrupt boundary over
PP4	404	38 to 53cm	medium brown w/ charcoal flecks. Inorganic granular loose medium sands with few (more than 003) small sub angular varied clasts
PP4	405	53 to 65-70cm	yellow/orange medium sands with few small subrounded sedimentary clasts
PP4	406	65 to c80cm	yellow orange (w/ charcoal flecks) weakly blocky medium sand with very few small rounded and subrounded gravels.
PP4	407	80cm	in situ bed rock with striations running NW-SE

Figure 219: Manor Bridge: Popples: contexts and soil descriptions

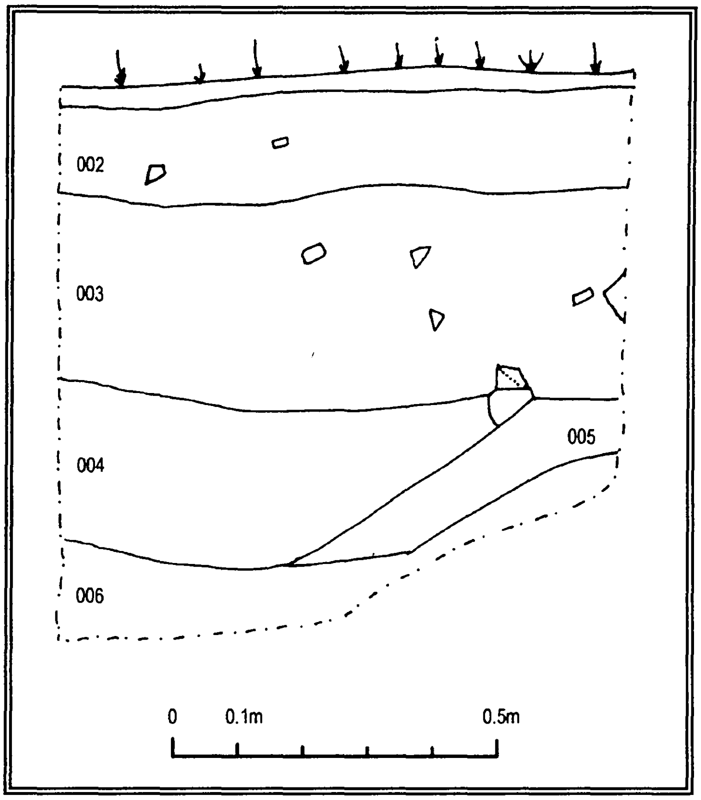


Figure 220: Manor Bridge: Popples: PP1 section

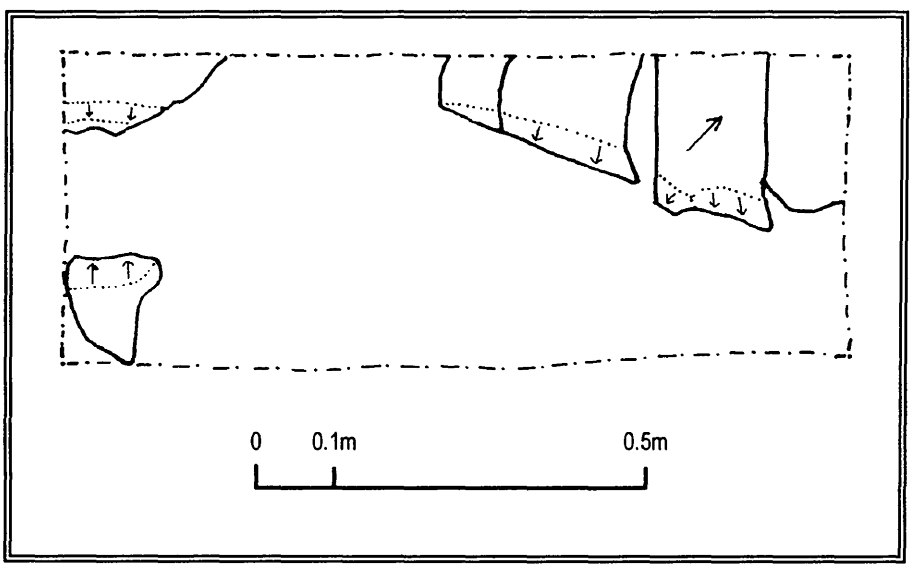


Figure 221: Manor Bridge: Popples: PP2 stone feature

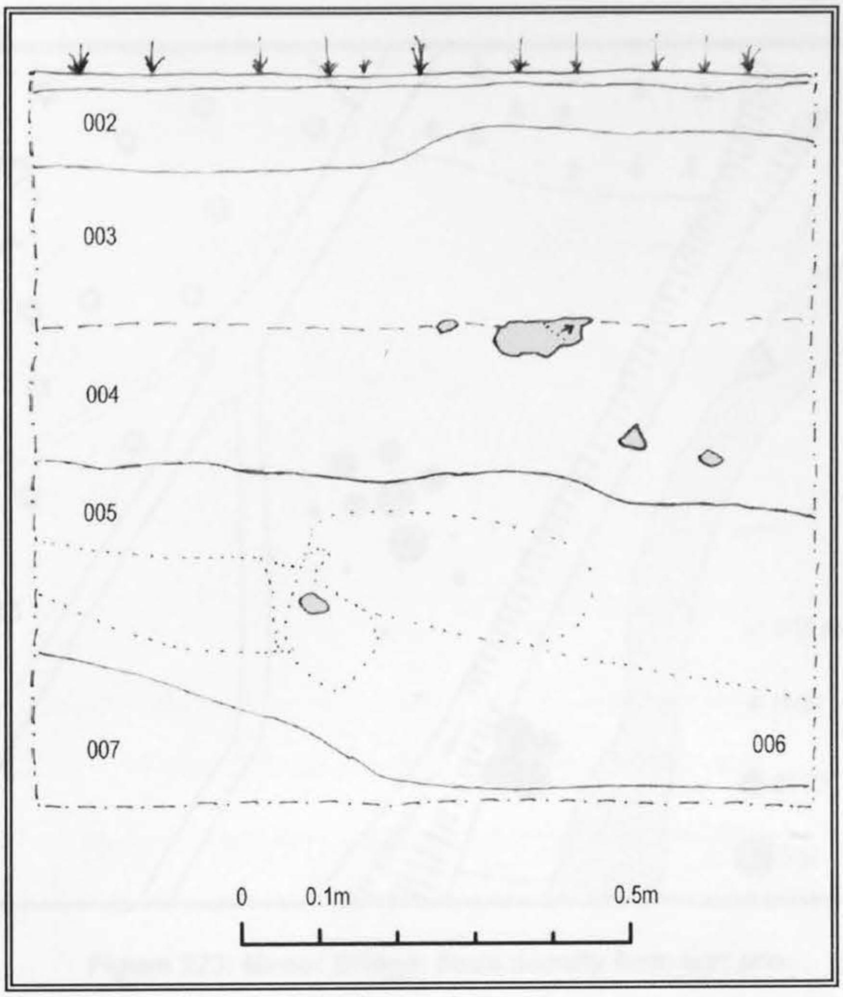


Figure 222: Manor Bridge: Popples: PP3 section

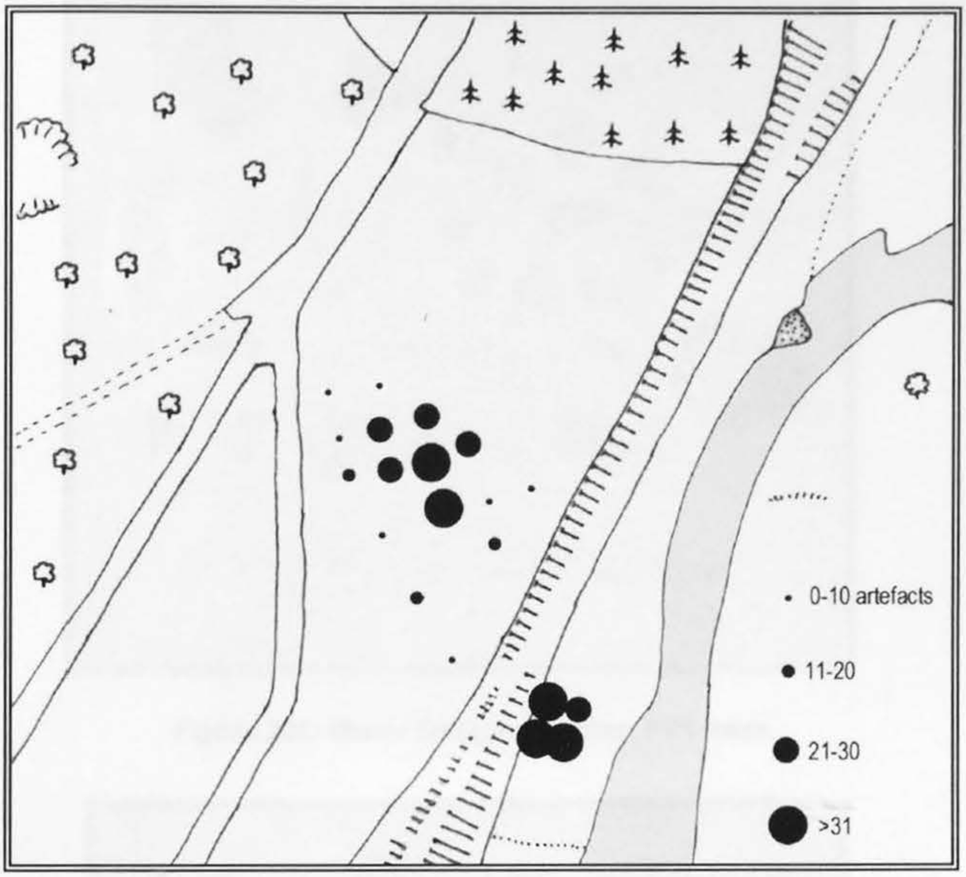


Figure 223: Manor Bridge: finds density from test pits

Pit Code	Number of Artefacts	Pit Code	Number of Artefacts
PP5	2	PP14	33
PP6	13	PP15	27
PP7	1	PP16	3
PP8	13	PP17	9
PP9	16	PP18	22
PP10	31	PP19	25
PP11	25	PP20	5
PP12	2	PP21	0
PP13	2	PP22	0
		Total	229

Figure 224: Manor Bridge: finds density 'cow field'

Figure 225: Manor Bridge: Popples: PP1 finds

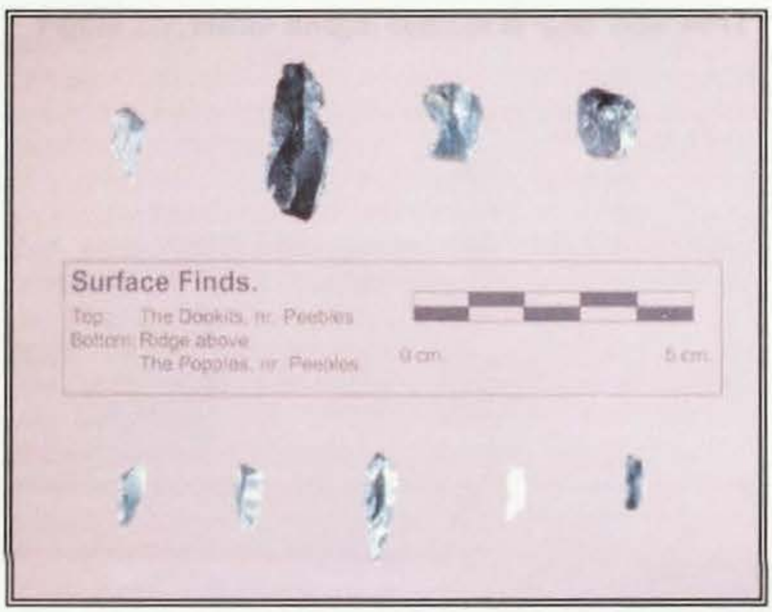


Figure 226: Manor Bridge and the Dookits: finds

Figure 227: Manor Bridge: bedrock in 'cow field' PP11

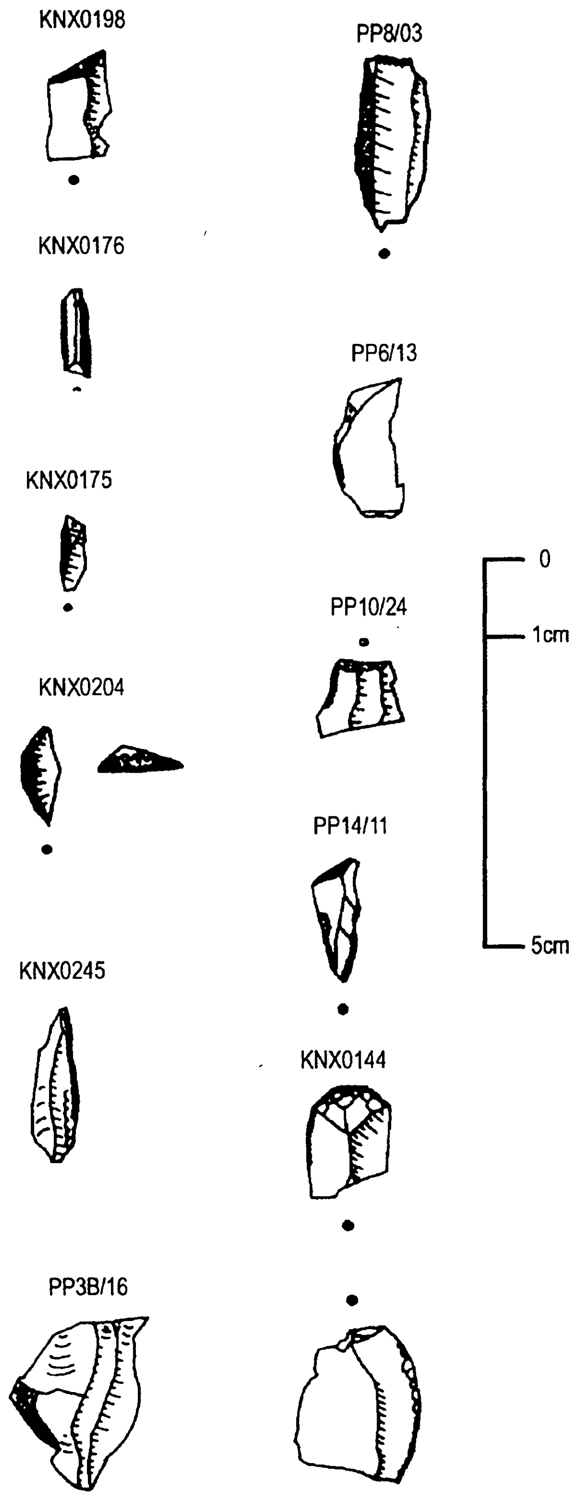


Figure 228: Manor Bridge: artefacts 1

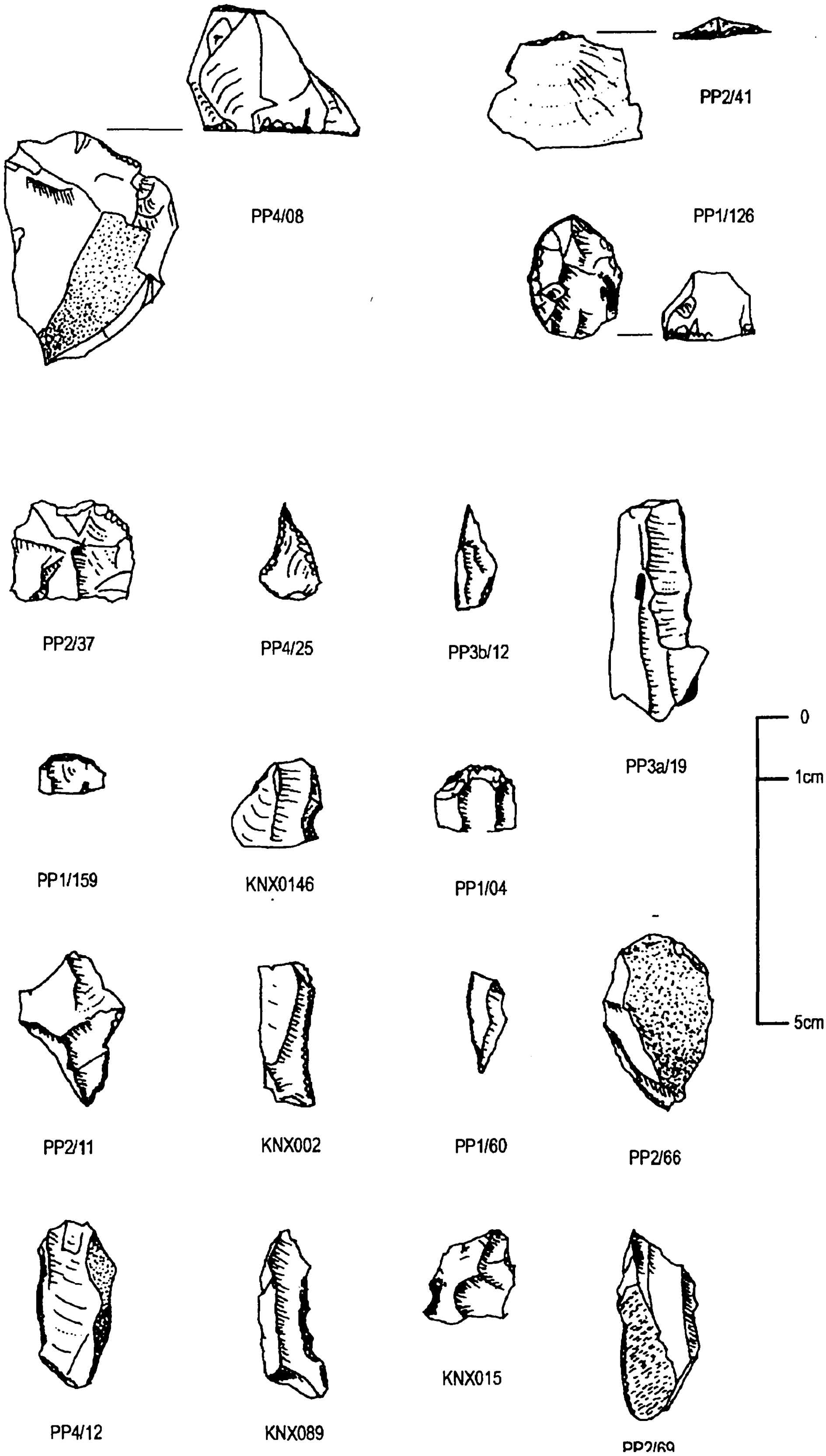


Figure 229: Manor Bridge: artefacts 2

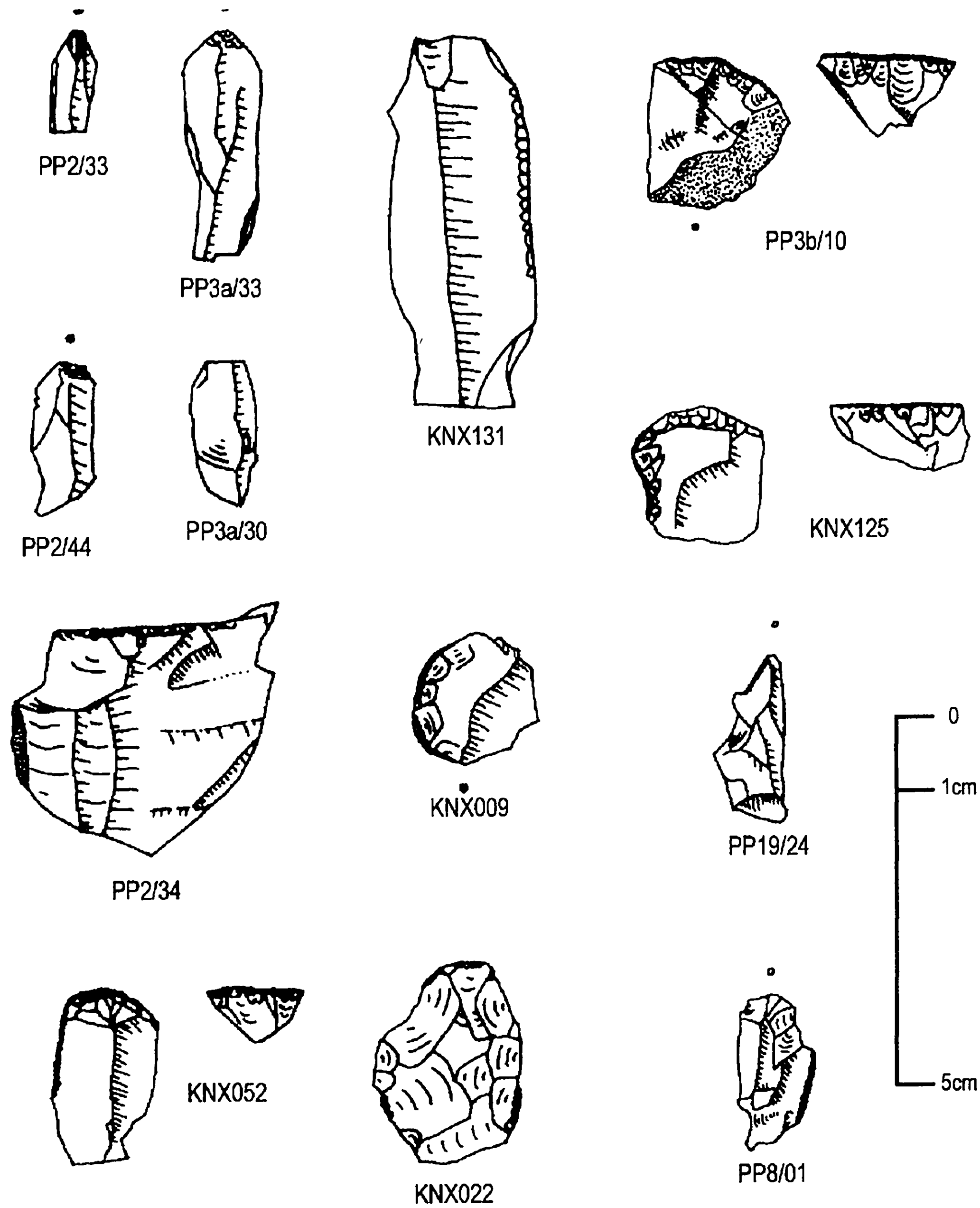


Figure 230: Manor Bridge: artefacts 3

Figure 231: Manor Bridge: anvil

Figure 232: Manor Bridge: finds from PP1, The Popples

Condition	%	N
Fresh	83.5	727
Abraded	3.0	26
Patinated	1.4	12
Rolled	0.2	2
Burnt	11.9	104
		871

(26 artefacts <10mm were not analysed individually)

Figure 233: Manor Bridge: condition of artefacts

Raw Material	%	N
Flint	12.8	106
Chert	85.8	710
Chalcedony	0.4	3
Agate	0.1	1
Quartz	0.3	2
Mudstone	0.1	1
Unk	0.5	4
		827

(70 artefacts <10mm not individually identified)

Figure 234: Manor Bridge: raw materials

Blank	N	% of all finds
Flake (regular)	224	24.9
Flake(irregular)	254	28.3
Blade	93	10.4
Core	62	6.9
Chunks	246	27.4
Bi-polar core	1	0.1
Bashed Lump	15	1.7
Unk	2	0.2
Total	897	

Figure 235: Manor Bridge: composition of the assemblage

Blank	N	Primary	%	Secondary	%	Tertiary	%
Flake (Reg.)	224	1	0.4	40	17.9	183	81.7
Flake (irreg.)	249	3	1.2	50	20.1	196	78.7
Blade	92	1	1.1	14	15.2	77	83.7
Total	565	4	0.7%	104	18.4%	456	80.7%

Figure 236: Manor Bridge: reduction sequence evidence

Chert cores	Min	Max	Avg	StDev
Formal: Length	14	51	27.4	8.0
Formal: Width	12	47	25.6	8.8
Formal: Thickness	12	45	18.3	7.3
Not Formal: Length	15	51	28.3	8.8
Not Formal: Width	9	42	25.8	8.8
Not Formal: thickness	11	25	16.5	3.5
Bashed Lump: Length	16	45	28.5	9.1
Bashed Lump: Width	11	54	23.7	11.2
Bashed Lump: Thickness	3	32	14.9	8.1

Figure 237: Manor Bridge: size of chert cores and bashed lumps

	Flake (Reg.) N	Flake (Reg.) % of type	Blade N	Blade % of type
Flint	32	14.2	18	19.4
Chert	192	85.0	74	79.5
Other	2	2.2	1	0.1

Figure 238: Manor Bridge: raw materials for different blanks. Avg. flint use 12.8%

		Length	Width	Thickness
Blade	Flint (n=7)	24.2±7.5	11.4±1.9	3.4±1.6
Blade	Chert (n=22)	18.8±5.1	7.6±1.8	2.8±1.5
Flake Reg	Flint (n=15)	16.9±5.5	12.9±3.4	4±1.8
Flake Reg	Chert (n=85)	17.4±5.3	11.4±1.9	3.4±1.6

Figure 239: Manor Bridge: size of complete unmodified removals

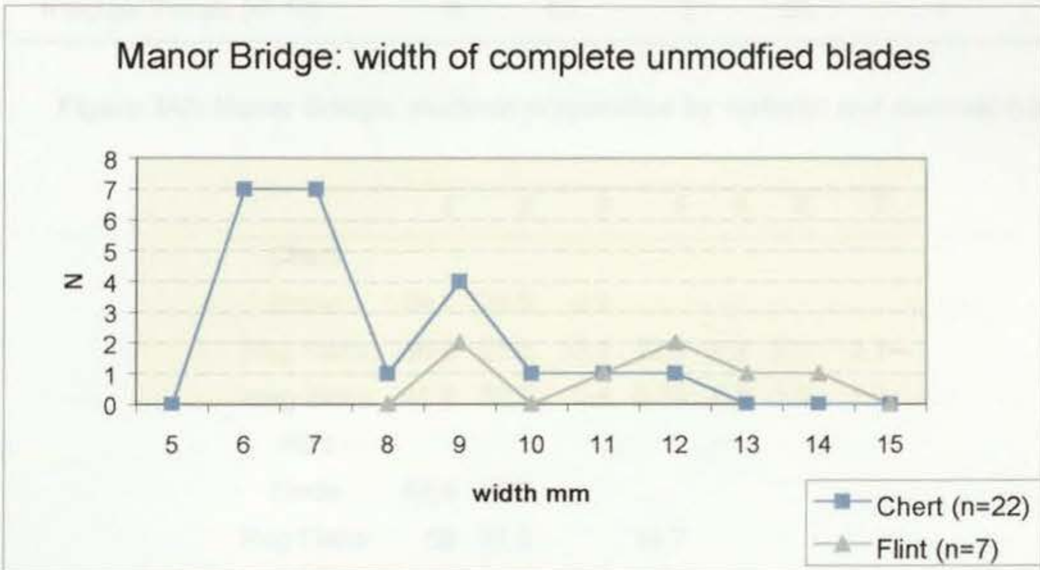


Figure 240: Manor Bridge: width of complete unmodified blades

	Absent N	Absent %	Simple N	Simple %	Complex N	Complex %
Blades	8	21.6	20	54.1	9	24.3
Regular Flakes	35	29.4	65	54.6	19	16.0
Irregular Flakes	41	62.1	21	31.8	4	6.1

Figure 241: Manor Bridge: platform preparation at Manor Bridge

	Absent N	Absent %	Simple N	Simple %	Complex N	Complex %
CHERT						
Blades (n=29)	8	27.6	15	51.7	6	20.7
Regular Flakes (n=100)	31	31	55	55	14	14
Irregular Flakes (n=54)	34	63	17	31.5	3	5.5
FLINT						
Blades (n=8)	0	0	5	62.5	3	37.5
Regular Flakes (n=17)	2	11.8	10	58.8	5	29.4
Irregular Flakes (n=10)	6	60	3	30	1	10

Figure 242: Manor Bridge: platform preparation by material and removal type

	1	2	3	4	5	6	7
Chert							
Blade	64.7	26.5	8.8				
Reg Flake	36.5	31.3	10.4	12.5	5.2	2.1	2.1
Irreg Flake	41.5	30.2	9.4	5.73	7.5	3.8	1.9
Flint							
Blade	62.5	37.5					
Reg Flake	50	31.3		18.7			
Irreg Flake	11.1	22.2	33.3	11.1			22.2

Figure 243: Manor Bridge: platform width in mm by material and removal type as % of total

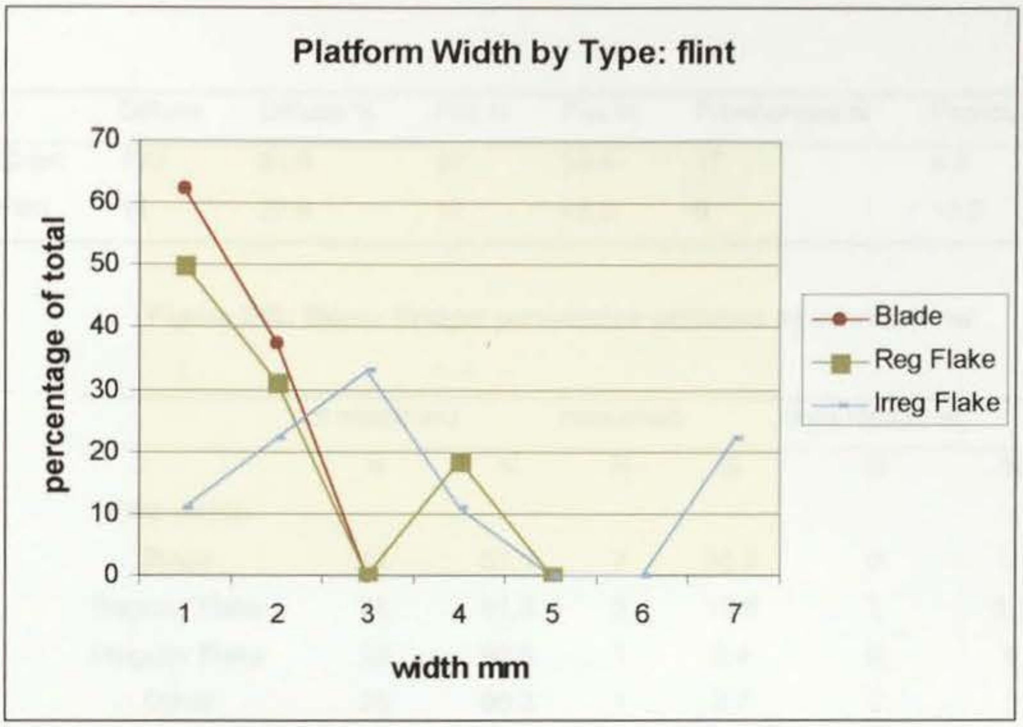


Figure 244: Manor Bridge: platform width by type of removal, flint

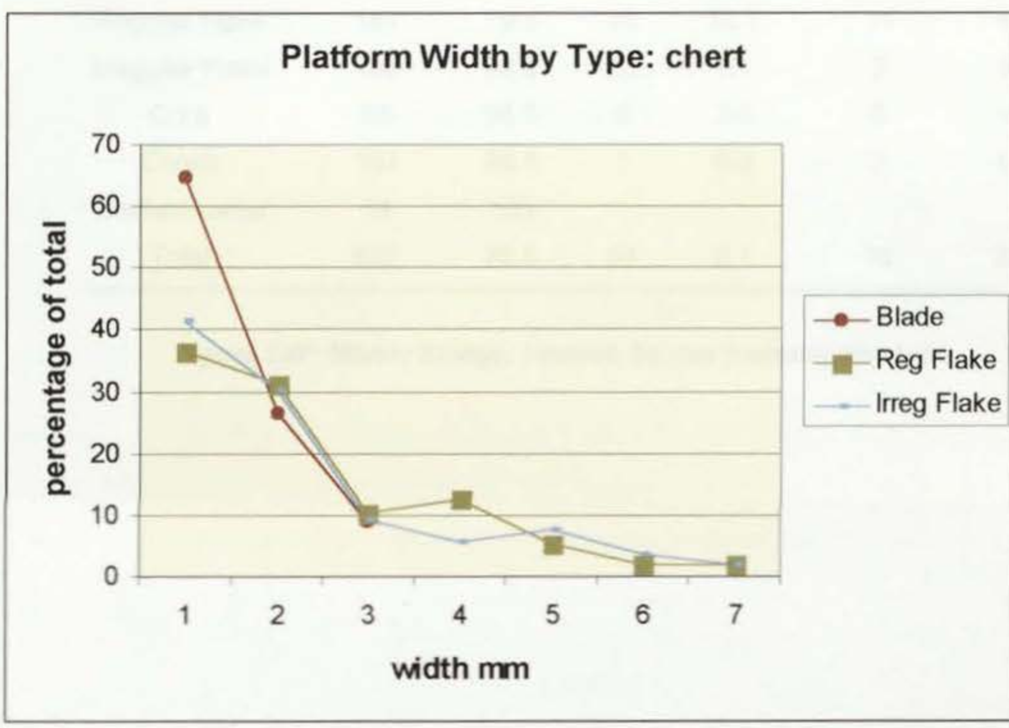


Figure 245: Manor Bridge: platform width by type of removal, chert

	Diffuse	Diffuse %	Flat N	Flat %	Pronounced N	Pronounced %
Chert	120	61.9	57	29.4	17	8.8
Flint	14	37.8	17	45.9	6	16.2

Figure 246: Manor Bridge: percussion evidence by raw material

	not retouched		retouched		poss retouched	
	N	%	N	%	N	%
Flint: n=105						
Blade	11	61.1	7	38.9	0	0
Regular Flake	26	81.3	5	15.6	1	3.1
Irregular Flake	28	96.6	1	3.4	0	0
Other	26	96.3	1	3.7	0	0
Total	91	86.7	14	13.3	1	1
Chert n=710						
Blade	52	72.2	20	27.8	0	0
Regular Flake	151	79.5	28	14.7	11	5.8
Irregular Flake	196	92.5	13	6.1	3	1.4
Core	55	96.5	2	3.5	0	0
Chunk	154	98.1	1	0.6	2	1.3
Bashed Lump	14	100				
Total	622	88.6	64	9.1	16	2.3

Figure 247: Manor Bridge: retouch by raw material and type

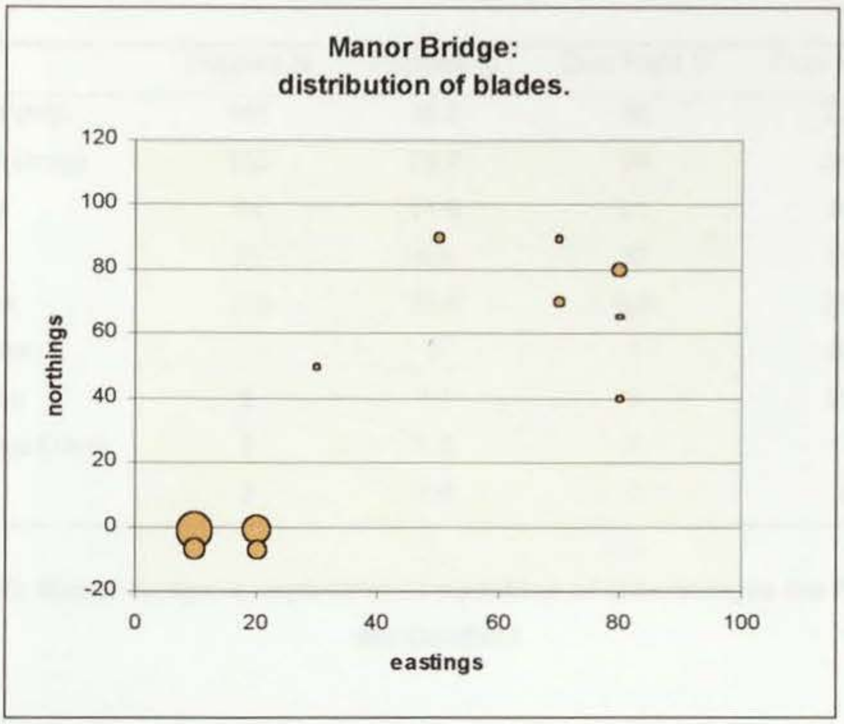


Figure 248: Manor Bridge: comparative distribution of blades the Popples and the Cowfield

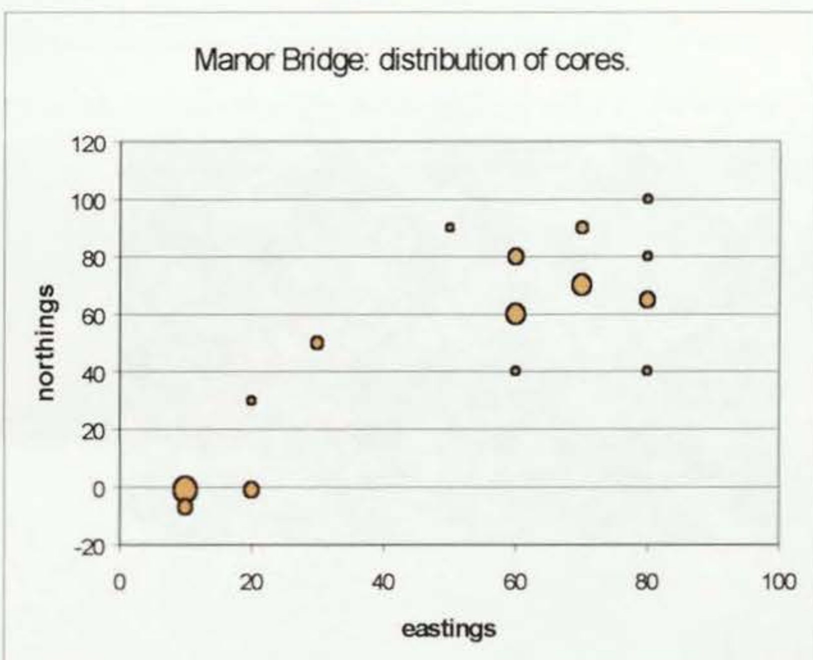


Figure 249: Manor Bridge: comparative distribution of cores the Popples and the Cowfield

	Popples N	Popples %	Cow Field N	Cow Field %
Flake (reg)	141	26.2	85	22.5
Flake (irreg)	155	28.7	99	26.3
Blade	64	11.9	31	8.2
Core	25	4.6	37	9.8
Chunk	138	25.6	108	28.6
Bi-polar		0	1	0.3
Pebble	6	1.1	9	2.4
Bashed Lump	8	1.5	7	1.8
Unk.	2	0.4	0	0

Figure 250: Manor Bridge: comparative composition of assemblages the Popples and the Cowfield

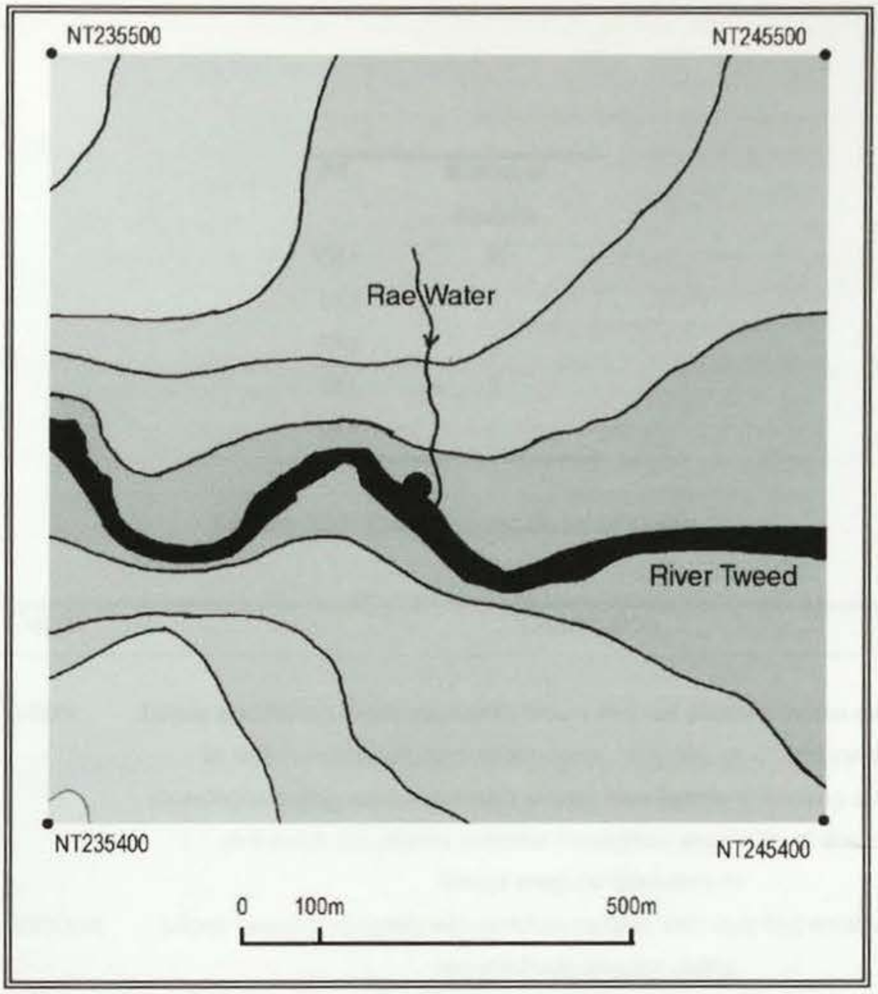


Figure 251: Dookits, local landscape (see Fig 22 for key, Fig 23 for regional landscape)

Figure 252: Dookits: view up stream

Pit	Number of artefacts
DK1	35
DK2	1
DK3	3
DK4	3
DK5	1

Figure 253: Dookits: location of finds

	Depth	Description
DK1		
DK101	0-8cm.	Loose and fibrous black loam with brown and red patches (some clays), moderate to well humified organic components. Very few small and medium sub-rounded/sub-angular sedimentary clasts. Also lenses of burning and coins, nails, tent-pegs, pot noodle material throughout depth (?root disturbance)
		Abrupt irregular boundary to
DK102	8-25/30cm	Loose brown fine sands with pink/tan mottles with very few small-medium sub-rounded/sub-angular clasts.
		Indistinct boundary to
DK103	25/30-35/40cm	Orange-brown fine sands with few small-medium rounded clasts (erratics and sedimentary)
		Indistinct boundary to
DK104	35/40-58/62cm	Red/brown fine sand with moderate quantities of small medium large and massive sub angular and subrounded clasts including shattered/tumbled material
		Undulating boundary to
DK2		
DK201	0-4cm	Medium – dark brown silty sand with well humified organic component.
		Clear boundary above
DK202	4cm to 14-28cm	Medium brown loose granular medium-sand with moderate small and medium sub rounded and sub-angular clasts. Also modern finds in upper layers of DK202.
		Bedrock emerging throughout section from 14-28cm
DK203		Bedrock – broken and shattered in situ with weathering visible.
DK3		
DK301	0-4cm	root mat: black sand-silts with high poorly humified organic component. Few-moderate small-medium clasts of sub-angular and sub-rounded sedimentary rocks.
		Sharp, undulating boundary over

DK302	4-6/30cm	Brown fine sands with moderate small-medium and large clasts of mainly sub-angular material sedimentary and erratics. Also some pockets of compacted yellow sands at base.
DK303	6/30cm	Bedrock from 6-30cm in different places Weathering sedimentary rocks tilting to SW.
DK4		
DK401	0-3cm	Turf mat: dark brown silty-sand with moderate humification Clear, regular boundary over
DK402	3-15/17cm	Loose light-brown fine sands with few small (occ. medium) sedimentary and erratic clasts
DK403	15/17-30/41cm	Medium brown with orange sand with few small (occ. medium) sedimentary and erratic clasts
DK404		Weathering sedimentary bedrock

Figure 254: Dookits: soil profiles

Figure 255: Dookits: C303, weathering bedrock

Blank	Total		Flint	as % of raw mat	Chert	as % of raw mat	Other
Flake (Reg)	50	33.8%	9	39.1%	41	33.3%	0
Flake (irreg)	36	24.3%	4	17.4%	31	25.2%	1
Blade	12	8.1%	3	13.0%	9	7.3%	0
Core	6	4.1%	1	4.3%	5	4.1%	0
Chunk	42	28.4%	6	26.1%	35	28.5%	1
Bashed Lump	2	1.4%	0	0	2	1.6%	0
	148		23		123		

Figure 256: Dookits: composition of assemblage

Blade width	Flint	Chert
6mm	0	3
7mm	0	2
8mm	2	0
9mm	1	1
10mm	0	0
11mm	0	1
12mm	0	2
	3	9

Figure 257: Dookits: blade width (all blades)

Flakes	Flint n=3				Chert n=20			
	Min.	Max.	Avg.	St.dev	Min.	Max.	Avg.	St.dev
Length	13	20	17	3.6	11	32	17.2	5.1
Width	6	15	10.3	4.5	7	30	14.5	5.6
Thickness	2	6	4	2	1	14	5.5	3.1

Figure 258: Dookits: size of regular flakes (complete, unmodified)

platform prep	Total N	Flint N	As % raw mat	Chert N	As % raw mat	Chalcedony N
Absent	17	4	50	12	37.5	1
Simple	20	4	50	16	50	0
Complex	4	0	0	4	12.5	0
N	41	8		32		1

Figure 259: Dookits: platform preparation by material

	Not retouched	% of material not retouched	Retouched	% of material retouched	Possibly Retouched	% of material possibly retouched
Flint	17	73.9	5	21.7	1	4.3
Chert	103	83.7	15	12.2	5	4.1
Other	2	100				
	122	82.4	20	13.5	6	4.1

Figure 260: Dookits: proportion of material retouched

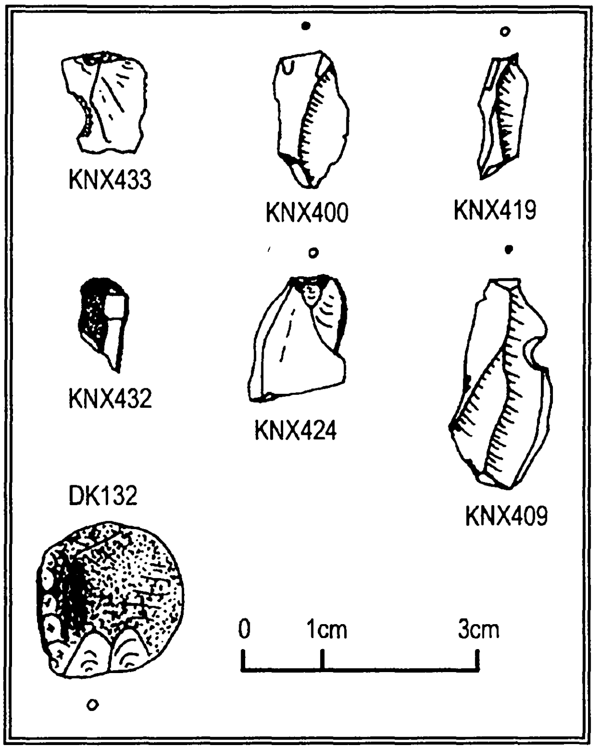


Figure 261: Dookits: lithics

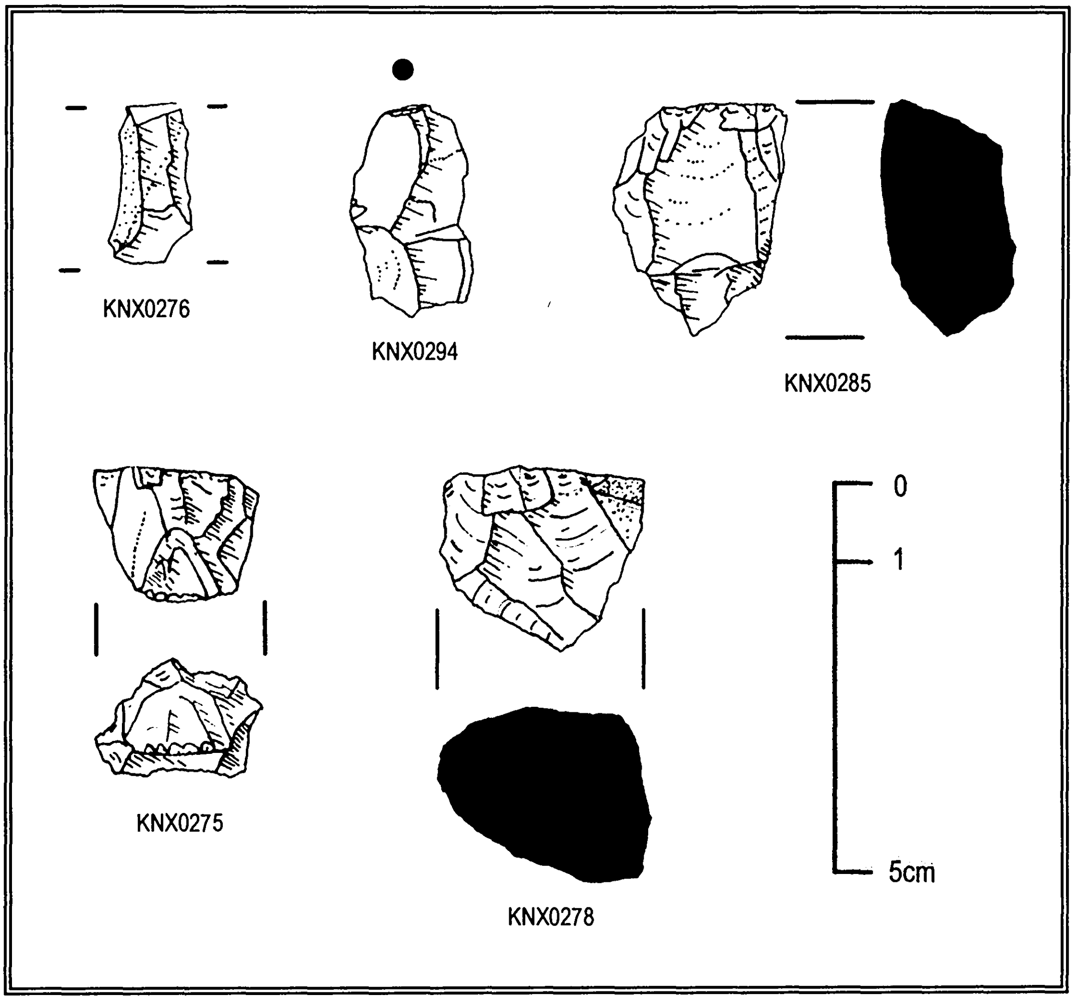


Figure 262: Manor Bridge 'plantation': lithics

Blank	N	
Bashed Lump	5	11.1%
Blade	2	4.4%
Chunk	9	20.0%
Core	6	13.3%
Flake Irreg	10	22.2%
Flake Reg	13	28.9%
	45	

Figure 263: Manor Bridge 'plantation': composition of assemblage

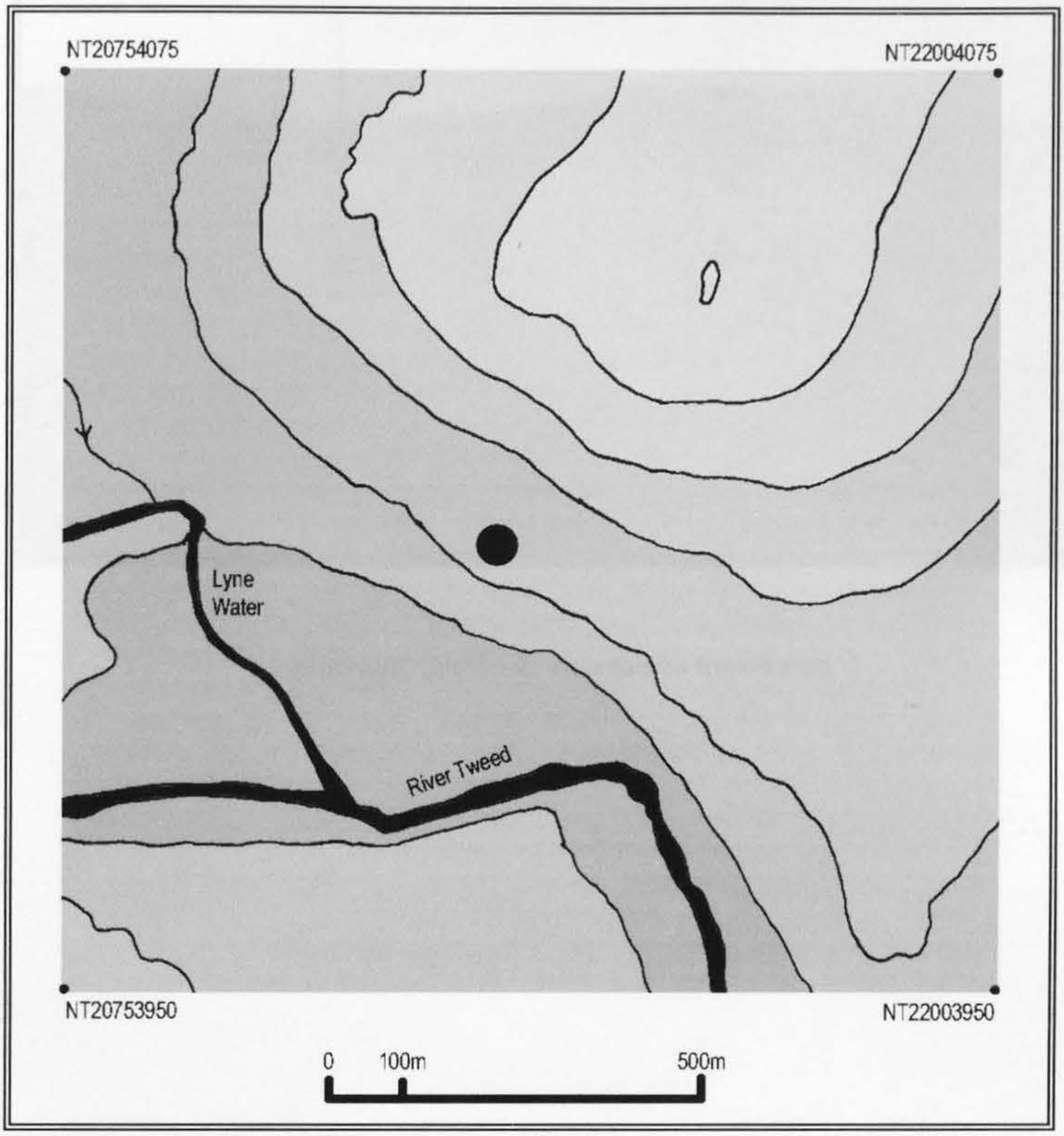


Figure 264: Edston 2: location (See Fig 22 for key, Fig 23 for regional landscape)

Figure 265: Edston 2: view to site from south

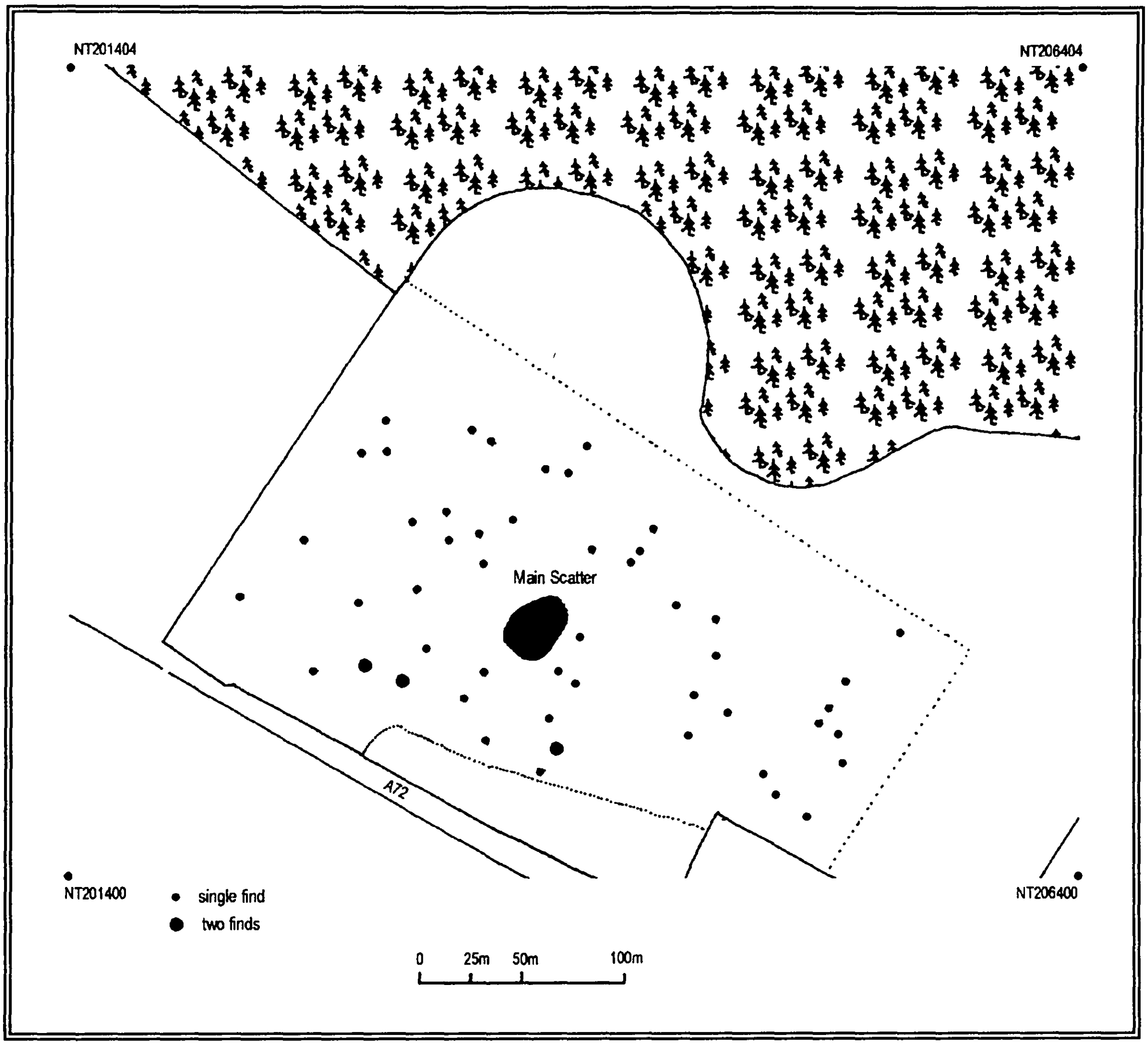


Figure 266: Edston 2: location of finds

Pit	Plough soil	No. artefacts	Notes
140/80	20-25cm	0	
145/75	25cm	3	
145/85	25cm	3	
150/70	25cm	5	
150/80	30cm	3	
150/90	25cm	5	
155/75	25cm	5	
155/85	25cm	5	
160/80		Possible anvil?	Abandoned @ 15cm

Figure 267: Edston 2: No of finds in test pits

	Total	%	Flint	Chert	%
bashed lump	2	4%		2	4.3%
bipolar cores	1	2%		1	2.2%
Blades	4	8%	1	3	6.5%
Chunks	14	29%		14	30.4%
Cores	7	15%		7	15.2%
Flakes – regular	14	29%	1	12	26.1%
Flakes – irregular	5	10%		6	13.0%
Split pebbles	1	2%		1	2.2%
Total	48		2	46	

Figure 268: Edston 2: composition of background scatter.

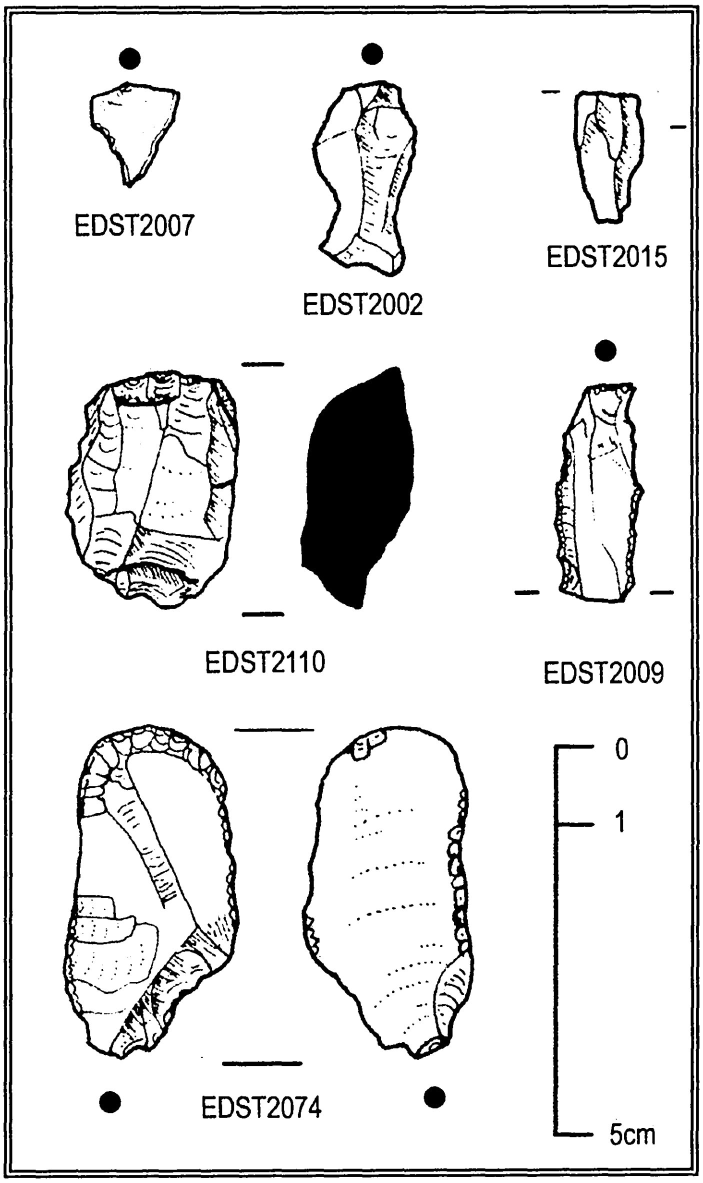


Figure 269: Edston 2: lithics

	total	%	Flint	Quartz	Chert	%
Bashed lump	1	1.7%			1	1.8%
Bipolar cores	8	13.6%		1	7	12.5%
Blades	8	13.6%			8	14.3%
Chunks	17	28.8%			17	30.4%
Cores	6	10.2%	1		5	8.9%
Flakes - regular	12	20.3%			12	21.4%
Flakes – irregular	6	10.2%	1		5	8.9%
Split pebbles	1	1.7%			1	1.8%
Total	59		2	1	56	

Figure 270: Edston 2: composition of the scatter

	N	%	Chalcedony		Chert		Flint		Other	
Kale 1										
Bipolar Core	2	1.4%			1	3.3%	1	1.9%	1	
Blades	23	16.4%	5	10.0%	6	20.0%	12	23.1%		
Chunk	18	12.9%	6	12.0%	6	20.0%	5	9.6%		
Core	8	5.7%	3	6.0%	4	13.3%	1	1.9%		
Flake I	28	20.0%	8	16.0%	4	13.3%	13	25.0%	3	
Flake R	61	43.6%	28	56.0%	9	30.0%	20	38.5%	4	
Proportion of total raw mat	140			35.7%		21.4%		37.1%		5.7%
Kale 2										
Blades	34	29.1%	12	30.0%	4	30.8%	17	30.9%	1	
Chunk	10	8.5%	4	10.0%	2	15.4%	3	5.5%	1	
Core	4	3.4%	1	2.5%		0.0%	2	3.6%	1	
Flake I	21	17.9%	8	20.0%	2	15.4%	9	16.4%	2	
Flake R	48	41.0%	15	37.5%	5	38.5%	24	43.6%	4	
Proportion of total raw mat	117			34.2%		11.1%		47.0%		7.7%

Figure 271: Kalemouth: composition of samples Kale 1 and Kale 2

		Plat Prep				Plat Width							N
		None	Simple	Comple	n	1	2	3	4	5	6	7	
Kale1	Chal	4	13	1	18	8	5	5	1			1	20
		22.2%	72.2%	5.6%		40.0%	25.0%	25.0%	5.0%	0.0%	0.0%	5.0%	
	Chert	3	3	1	7	1	3	1			2		
		42.9%	42.9%	14.3%		14.3%	42.9%	14.3%	0.0%	0.0%	28.6%	0.0%	27
	Flint	3	21	4	28	11	5	8	1	1	1		
		10.7%	75.0%	14.3%		40.7%	18.5%	29.6%	3.7%	3.7%	3.7%	0.0%	
Kale 2	Chal	8	13	0	21	6	7	7	2				22
		38.1%	61.9%			27.3%	31.8%	31.8%	9.1%				
	Chert	4	5	0	9	4	4	1		1			10
		44.4%	55.6%			40.0%	40.0%	10.0%		10.0%			
	Flint	3	15	0	18	10	4	1	2	0	2		19
		16.7%	83.3%			52.6%	21.1%	5.3%	10.5%	0.0%	10.5%		

Figure 272: Kalemouth: platform preparation by type

	Kale1								Kale2						
BLADES		Min	Max	Avg	St Dev	IQR1	IQR3	BLADES		Min	Max	Avg	St Dev	IQR1	IQR3
Chalcedony (n=7)	L	13	37	24.4	8.2	19.5	29	Chalcedony (n=3)	L	30	34	32.33	2.08	n-a	n-a
	W	5	12	8.7	2.69	6.5	10.5		W	10	15	12	2.65		
	D	2	5	3.4	0.98	3	4		D	4	7	5.66	1.53		
Chert (n=1)	L			20				Chert (n=5)	L	10	29	19.8	7.19		
	W			7					W	3	11	6.6	2.97		
	D			3					D	2	3	2.6	0.55		
Flint (n=8)	L	12	31	21.6	5.8	18.75	24.75	Flint (n=10)	L	13	40	23.3	8.58		
	W	5	11	8.1	2.47	5.75	10		W	5	15	10.1	3.98		
	D	1	\3	2.5	0.76	2	3		D	2	6	3.4	1.43		
Flake Reg															
Chalcedony (n=10)	L	18	38	26.1	7.17	21.25	29.75	Chalcedony (n=18)	L	13	36	23.3	6.76	19.5	26
	W	13	22	16.8	3.12	13.5	18.75		W	7	28	16.9	6.36	10.75	20.75
	B	2	10	5.1	2.33	4	5		B	2	9	5.1	2.39	3	7
Chert (n=4)	L	18	28	22	4.32			Chert (n=8)	L	18	30	24	4.6	20.5	28.25
	W	9	20	14.25	4.57				W	11	17	14.4	2.13	13.5	15.5
	B	3	7	5.25	1.7				B	4	8	5.1	1.46	4	6
Flint (n=15)	L	13	30	22.9	4.66	20	26	Flint (n=16)	L	12	30	20.9	4.81	17.75	23
	W	10	26	16.3	4.9	13	20.5		W	9	21	13.9	3.7	11.75	15.25
	D	2	12	5.1	2.66	3	6		D	1	13	4.25	2.7	2.75	5

Figure 273: Kalemouth: size of removals

Figure 274: Kalemouth: surface finds of microliths, W Elliot

	Chert		Flint		Chalcedony		Other		N	Source
	n	%	n	%	n	%	n	%		
Dryburgh	252	64.0%	80	20.3%	51	12.9%	11	2.8%	394	Munro
Rink (Haley)		83.0%		9.0%		7.0%		4.0%	0	Elliot
Dookits	5	83.3%	1	16.7%		0.0%		0.0%	6	
Manor Bridge	57	91.9%	4	6.5%		0.0%	1	1.6%	62	
Kale 1	4	50.0%	1	12.5%	3	37.5%		0.0%	8	Forsyth
Kale 2		0.0%	2	50.0%	1	25.0%	1	25.0%	4	Forsyth
Kale combined	4	33.3%	3	25.0%	4	33.3%	1	8.3%	12	
Cavalry Park	20	100.0%		0.0%		0.0%		0.0%	20	
Fens	13	59.1%	5	22.7%	4	18.2%		0.0%	22	Munro
Craigsfordmains	1	6.3%	13	81.3%	2	12.5%		0.0%	16	
Rink	75	62.0%	20	16.5%	16	13.2%	10	8.3%	121	Elliot
Shiplaw	9	90.0%	1	10.0%					10	
Edston	5	83.3%	1	16.7%					6	

Figure 275: proportions of raw materials for cores

	Material	Length (mm)			Width (mm)			Depth (mm)			Weight			N
		Avg	St	IQR	Avg	St	IQR	Avg	St	IQR	Avg	st	IQR	n
Craigsford Mains	Flint	29.4	7.7	22 - 35	22.8	4.8	21 - 26	13.0	2.4	11 - 15	9.9	3.1	8 - 10	9
Dryburgh Mains	Chalcedony	22.3	7.3	15.25 - 26	19.4	4.4	16.25 - 22.5	14.5	2.9	12.25 - 16	8.0	5.9	4 - 8.75	22
	Chert	25.9	7.7	21 - 28.5	22.7	7.0	17.5 - 27	16.2	6.6	11 - 17.5	13.2	14.2	6 - 13.5	43
	Flint	26.4	6.0	21 - 31	21.0	5.6	17 - 23	14.0	3.3	12 - 16	9.2	4.9	5 - 13	21
Fens	Chalcedony	21.5	3.3		16.8	5.3		12.5	1.7		5.5	1.3		4
	Chert	23.9	7.3	20.5 - 28	17.9	5.6	14.25 - 22	11.4	5.0	8.5 - 14.75	7.4	4.5	4.25 - 10.25	8
	Flint	18.3	4.9		16.0	1.0		10.0	1.0		3.7	0.6		3
Rink	Chalcedony	22.2	4.2	20.75 - 26	20.6	5.0	17 - 24.25	15.4	3.2	12.75 - 17.25	9.3	5.9	5.75 - 12.25	16
	Chert	24.7	5.3	20.5 - 28	22.1	5.8	18.5 - 25.5	16.6	4.5	14 - 19	11.8	8.4	6 - 13.5	75
	Flint	22.8	5.1	20.25 - 26.25	18.9	5.4	15.75 - 21.75	14.4	5.3	11.25 - 17.25	7.9	4.9	4 - 10.5	20
	Chalcedony?	27.1	3.9	24.35 - 31.25	25.7	5.7	20.75 - 29.25	20.5	6.1	16.75 - 25.75	14.9	6.2	12 - 15.25	10
Cavalry Park	Chert	29.4	8.7	22 - 35	26.9	8.5	21 - 35	19.5	6.5	15 - 23				17
Dookits	Chert	28.6	3.1		26.7	3.1		14	1.0					3
Manor Bridge	Chert	27.6	8.3	22.5 - 32	25.1	8.3	19 - 31	16.5	3.5	14 - 18				43
Manor Bridge N River/W road ('Plantation')	Chert	33.3	14.4	25 - 40.5	27.1	7.5	21 - 30	18.0	3.9	15.5 - 21				11
Shiplaw	Chert	32.4	11	23 - 37	32.9	7.2	29 - 37	22.9	7.1	18 - 25				8
Wide Hope Shank	Chert	28.5	10	22.25 - 35	30.2	8.5	23.25 - 32.75	24.8	7.6	18.25 - 31				10

Figure 276: Tweed Valley: size of cores

Cores BMB657	N	N%	Weight	avg weight g
flint (platform)	80	19.5%	588	7.4
flint (bipolar)	11	2.7%	44	4
Chert (platform)	252	61.3%	2403	9.5
chert (bipolar)	5	1.2%	25	5
chalcedony (platform)	51	12.4%	343	6.7
Chalcedony (bipolar)	1	0.2%	4	4
chert/flint black	5	1.2%	29	5.8
Muds-ne	1	0.2%	66	66
Jasper	5	1.2%	26	5.2
	411		3462	

Figure 277: Dryburgh Mains: weight (in g.) of all cores at Dryburgh Mains

	Avg	St Dev	N
Chalcedony	8	5.9	22
Chert	13.5	14.1	43
Flint	9.2	4.9	21

Figure 278: Dryburgh Mains: average weights (in g.) of sub sample of intact cores

	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	>50
Chalcedony	52%	28%	8%	8%	4%	0	0	0	0	0	0
Chert	30%	32%	22%	0	2%	8%	2%	2%	0	0	2%
Flint	24%	44%	20%	8%	4%	0	0	0	0	0	0

Figure 279: Dryburgh Mains: weight (in g.) of intact platform cores by category

raw material	no plats	Quantity	% of raw material
Chalcedony	1	15	62.5%
Chalcedony	2	9	37.5%
Chert	1	24	52.2%
Chert	2	20	43.5%
Chert	3	2	4.7%
Flint	1	13	68.4%
Flint	2	6	31.6%
Flint	3	2	10.5%

Figure 280: Dryburgh Mains: number of platforms on cores of different materials

raw material	no plats	Morphology	N
Chalcedony	1	1 face	3
Chalcedony	1	Cylinder	4
Chalcedony	1	Pyramid	8
Chalcedony	2	Irregular	2
Chalcedony	2	at 90	2
Chalcedony	2	Opposed – on differing face	2
Chalcedony	2	Opposed – on same face	3
Flint	1	1 face	7
Flint	1	Cylinder	2
Flint	1	Irregular	1
Flint	1	Pyramid	3
Flint	2	at 90	1
Flint	2	Irregular	1
Flint	2	Opposed	1
Flint	2	Opposed – bifacial	1
Flint	2	Opposed – unifacial	1
Flint	2	Unifacial disc	1
Flint	3	Irregular	2
Chert	1	1 face	7
Chert	1	Cylinder	6
Chert	1	irregular - square/wedge	6
Chert	1	Pyramid	5
Chert	2	bifacial disc	1
Chert	2	Cylinder	2
Chert	2	Opposed	4
Chert	2	Opposed – bifacial	5
Chert	2	Opposed – unifacial	2
Chert	2	Opposed – pyrmidal	1
Chert	2	at 90	4
Chert	2	Irregular	1
Chert	3	Irregular	2

Figure 281: Dryburgh mains: types of cores by differing raw materials

raw material	Blank	Avg weight	St Dev	IQR	N
Flint	Core	7.9	4.94	5.75 – 12.25	20
Flint	Bipolar	3.66	0.57		3
Chert	Core	11.79	8.43	12 – 15.25	75
Chert	Bipolar	2.66	1.53		3
Chalcedony?	Core	14.9	6.23	6 – 13.5	10
Chalcedony	Core	9.25	5.86	4 – 10.5	16

Figure 282: Rink Farm: average weights (in g.) of sub sample of intact cores

Raw material	-tal	1 - 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30	31 - 35	35 - 40	>40
Chalcedony	16	25%	44%	13%	13%	6%	0%	0%	0%	0%
Chalcedony?	10	0%	10%	60%	10%	10%	10%	0%	0%	0%
Chert	75	20%	31%	29%	11%	3%	1%	1%	4%	1%
Flint	20	30%	45%	15%	10%	0%	0%	0%	0%	0%

Figure 283: Rink Farm: weight (in g.) of intact platform cores by category

		average	Std dev	IQR1	IQR3
Flint	Length	21.86	6.61	20.25	26.25
	Breadth	18.1	6.33	15.75	21.75
	Thickness	13.81	5.69	11.25	17.25
Chert	Length	24.68	5.34	20.5	28
	Breadth	22.05	5.79	18.5	25
	Thickness	16.59	4.51	14	19
Chalcedony	Length	22.19	4.21	20.75	26
	Breadth	20.56	4.95	17	24.25
	Thickness	15.38	3.22	12.75	17.25
(?)Chal.	Length	27.1	3.87	24.25	31.25
	Breadth	25.7	5.74	20.75	29.25
	Thickness	20.5	6.1	16.75	25.75

Figure 284: Rink Farm: size of cores (mm)

raw material	no plats	N	
Chalcedony	1	11	69%
Chalcedony	2	5	31%
Chalcedony?	1	3	30%
Chalcedony?	2	5	50%
Chalcedony?	3	2	20%
Chert	1	41	55%
Chert	2	29	39%
Chert	3	5	7%
Flint	1	10	50%
Flint	2	9	45%
Flint	5	1	5%
		121	

Figure 285: Rink Farm: number of platforms on cores of different materials

raw material	no plats	Morphology	N
chalcedony	1	Cylinder irregular	1
chalcedony	1	Pyramid	3
chalcedony	1	Pyramid irregular	1
chalcedony	1	Uniface pebble	4
chalcedony	1	Uniface triangle	2
chalcedony	2	At 90 on opposite faces	4
chalcedony	2	Pyramid irregular	1
chalcedony?	1	Cylinder (half)	1
chalcedony?	1	Disc core	1
chalcedony?	1	Pyramid	1
chalcedony?	2	At 90 on opposite faces	2
chalcedony?	2	From same edge	1
chalcedony?	2	Opposed uniface	1
chalcedony?	2	Pyramid irregular	1
chalcedony?	3	Irregular	2
chert	1	Cylinder (half)	3
chert	1	Cylinder irregular	2
chert	1	Irregular	3
chert	1	Pyramid	10
chert	1	Pyramid irregular	1
chert	1	Uniface flat	3
chert	1	Uniface irregular	2
chert	1	Uniface on pebble	9
chert	1	Uniface triangle	8
chert	2	At 90 on different face	2
chert	2	At 90 on opposite faces	6
chert	2	At 90 on the same face	4
chert	2	Cylinder opposed	3
chert	2	Cylinder irreg	1
chert	2	Irregular	4

chert	2	Opposed faces	1
chert	2	Opposed uniface	4
chert	2	Opposed uniface triangle	4
chert	3	Irreg.	2
chert	3	Regular	2
chert	3	Uniface triangle	1
flint	1	Cylinder (half)	1
flint	1	Pyramid	4
flint	1	Pyramid irreg	1
flint	1	Uniface on pebble	3
flint	1	Uniface triangle	1
flint	2	At 90 on different face	1
flint	2	At 90 on opposite faces	1
flint	2	Cylindrical opposed	1
flint	2	Cylindrical with 2nd at ninety	1
Flint	2	Irreg.	1
Flint	2	Opposed faces	1
Flint	2	Opposed uniface	2
Flint	2	Pyramidal opposed	1
Flint	5	Regular	1

Figure 286: Rink Farm: types of cores by differing raw materials

Cores BMA2726	n	G	avg.
Flint	13	110	8.461538
Chert	1	3	3
Chalcedony	2	21	10.5

Figure 287: Craigsford Mains: weight of cores

	1 - 5	6 - 10	11 - 15
Chalcedony	0	1	1
Flint	1	7	2

Figure 288: Craigsford Mains: total of each weight category.

raw material	no plats	Quantity
chalcedony	1	1
chalcedony	2	1
flint	1	1
flint	2	8
flint	3	1

Figure 289: Craigsford Mains: number of platforms on cores of different materials

raw material	no plats	morphology	N
Chalcedony	1	single plat irregular cylinder	1
Chalcedony	2	opposed platform unifacial	1
Flint	1	single plat uni-facial	1
Flint	2	chunky*#	1
Flint	2	irregular*	1
Flint	2	on different faces, perpendicular	2
Flint	2	opp plat unifacial	4
Flint	3	mulit plat chunky*	1

* very small unusal cores,
\# core scraper

Figure 290: Craigsford Mains: types of cores by differing raw materials

	Blades					Flakes				
	n		weight		avg	n	%	Wt	%	avg
chert	673	60.5%	861	62.5%	1.27	3666	57.0%	4821	54.1%	1.32
chalcedony	106	9.5%	123	8.9%	1.16	893	13.9%	1507	16.9%	1.69
flint	334	30.0%	393	28.5%	1.17	1874	29.1%	2589	29.0%	1.38
	1113		1377			6433		8917		

Figure 291: Dryburgh Mains: average blade and flake weights

	Length			Breadth			Thickness			
	Avg	StDev	IQR	Avg	StDev	IQR	Avg	StDev	IQR	N
Chalcedony	27.1	9.0	22.5-34.5	11.3	3.6	9-14	4.4	1.5	3.5-6	19
chert	25.1	6.4	21-28	9.8	3.1	8-11	4.5	1.8	3-5	64
flint	28.0	5.5	24.5-32	11.1	3.1	9-13	4.3	2.3	3-5	31

Figure 292: Dryburgh Mains: average size of blades

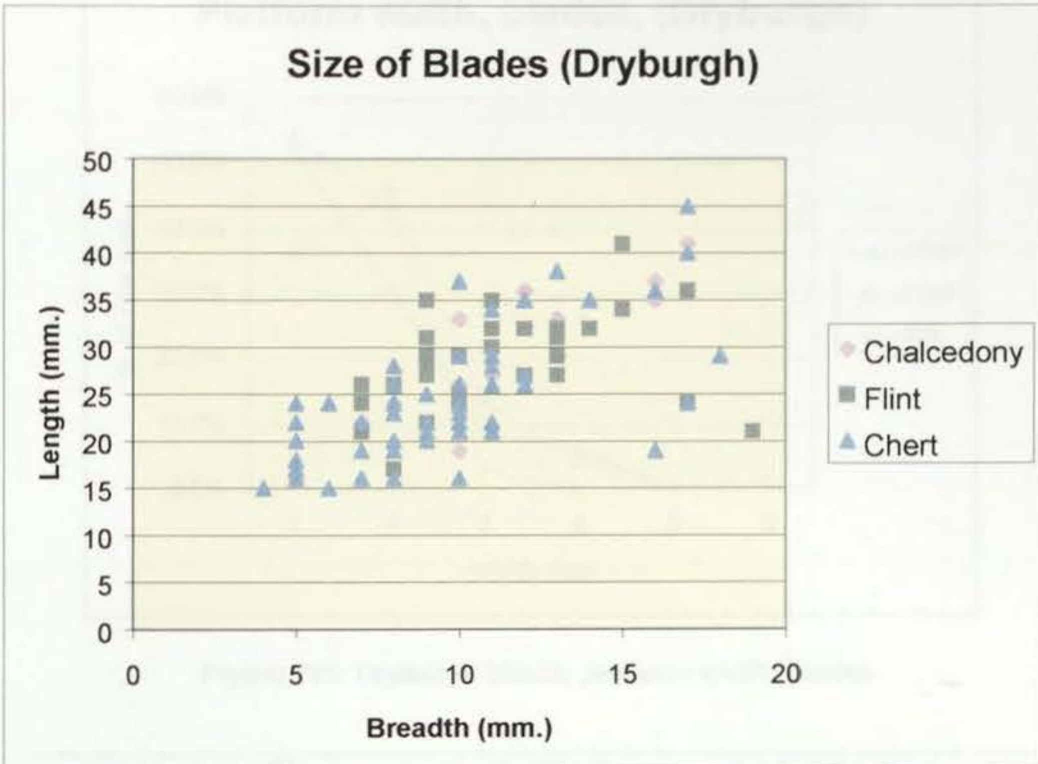


Figure 293: Dryburgh Mains: size of blades of different raw materials

	Platform Width (mm)			Platform Preparation			Bulb Type		
		N	%		N	%		N	%
Chalcedony	1	8	36.4	none	4	18.2	Diffuse	18	81.8
Chalcedony	2	10	45.5	simple	17	77.3	Flat	1	4.5
Chalcedony	3	3	13.6	complex	1	4.5	Prominent	3	13.6
Chalcedony	4	1	4.5						
chert	1	35	52	none	11	17.2	Diffuse	50	74.6
chert	2	21	31.3	simple	45	70.3	Flat	4	6.
chert	3	6	9	complex	8	12.5	Prominent	13	19.4
chert	4	4	6						
chert	6	1	1.5						
flint	1	18	54.5	none	4	12.	Diffuse	29	87.9
flint	2	14	42.4	simple	26	78.8	Prominent	4	12.1
flint	3	1	3	complex	3	9			

Figure 294: Dryburgh Mains: production evidence on blades

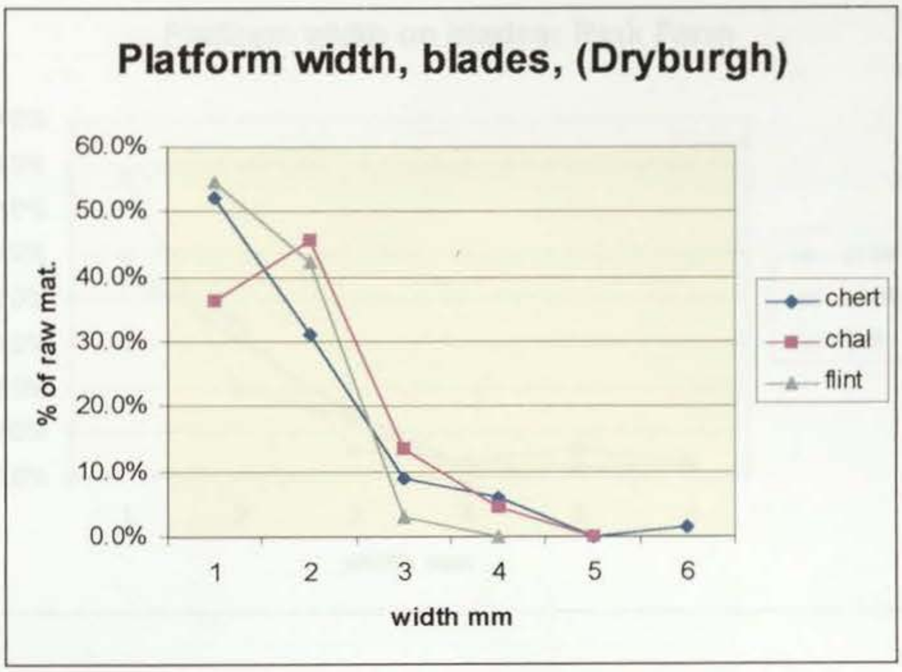


Figure 295: Dryburgh Mains: platform width, blades

raw material	Avg L	StDev L		Avg B	StDev B		Avg T	StDev T		N
chalcedony	28.6	6.9	24 -31	12.1	3.3	9-14	4.9	1.8	4- 7	17
chert	24.2	4.0	22- 27	10.7	2.4	9-12.25	4.7	1.8	4 -5.25	28
flint	23.1	6.3	19-24	10.6	3.0	9-13	4.1	1.1	4-4	17
pitchs-ne	33.0	7.0		14.7	3.8		5.3	0.6		3

Figure 296: Rink Farm: average size of blades

	1	2	3	4	5	6	N
chalcedony	14	11	2	1	2	1	31
chert	20	13	6	1	1	1	42
flint	31	9	6				46

Figure 297: Rink Farm: platform width on blades

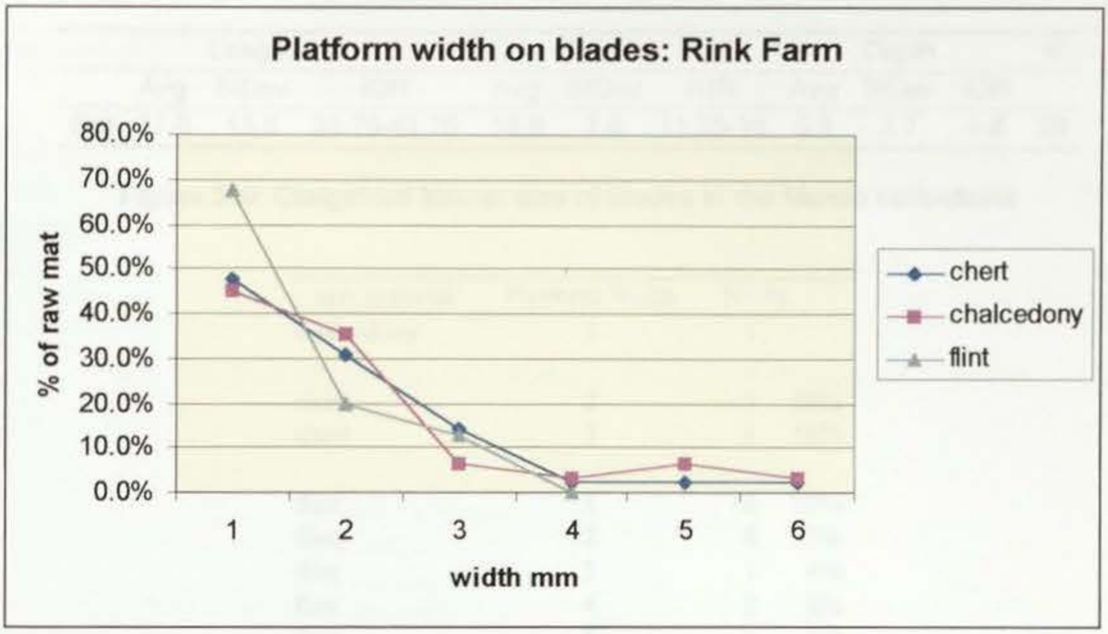


Figure 298: Rink Farm: platform width on blades

raw material	none		simple		complex		N
chert	23	54.8%	18	42.9%	1	2.4%	42
flint	10	23.3%	31	72.1%	2	4.7%	43
chalcedony	18	62.1%	10	34.5%	1	3.4%	29

Figure 299: Rink Farm: platform preparation on blades

	Length			Width			Depth			N
	Avg	StDev	IQR	Avg	StDev	IQR	Avg	StDev	IQR	
flint	37.0	13.5	26.75-41.75	15.6	7.6	11.25-16	5.3	2.7	4-6	26

Figure 300: Craigsford Mains: size of blades in the Munro collections

raw material	Platform Width	N	%
chalcedony	2	1	
chert	2	1	50%
chert	3	1	50%
flint	1	14	50%
flint	2	8	35%
flint	3	1	4%
flint	4	2	8%
flint	5	1	4%

Figure 301: Craigsfordmains: platform width

raw material	Platform Preparatin	n	%
chalceondy	simple	1	100%
chert	simple	2	100%
flint	none	2	8%
flint	simple	21	81%
flint	complex	3	12%

Figure 302: Craigsfordmains: platform preparation

		Chert		Flint		Chalcedony		Other		-tal
		n	%	n	%	n	%	n	%	
Dryburgh	mesolithic	205	48.2%	192	45.2%	26	6.1%	2	0.5%	425
Eds-n 2	mesolithic	4	80.0%	1	20.0%					5
Shiplaw	mesolithic	7	100.0%							7
Cavalry Park	mesolithic	4	57.1%	3	42.9%					7
Dookits	mesolithic	15	75.0%	5	25.0%					20
Manor Bridge	mesolithic	64	82.1%	14	17.9%					78
Kale 1	meso-neo	7	20.0%	22	62.9%	4	11.4%	2	5.7%	35
Kale 2	meso-neo	9	33.3%	8	29.6%	10	37.0%			27
Fens	meso	15	65.2%	8	34.8%					23
Rink	meso	67	48.9%	55	40.1%	13	9.5%	2	1.5%	137
Springwood	meso	785	34.4%	419	18.4%	1047	45.9%	28	1.2%	2279
Springwood		13	21.7%	38	63.3%	9	15.0%			60
Kingsmuir	neo	10	71.4%	4	28.6%					14
Ferniehaugh	unk ?meso	6	85.7%	1	14.3%					7

Figure 303: Tweed Valley: retouched artefacts in differing raw materials

Retouched artefacts BMB651-654										
	Microliths	%	microburins	%	scrapers	%	misc	%		
Flint	38	40.40%	7	63.60%	60	48.00%	87	44.20%	192	45.0%
Chert	55	58.50%	3	27.30%	54	43.20%	95	48.20%	207	48.5%
Chalcedony	1	1.10%	1	9.10%	9	7.20%	15	7.60%	26	6.1%
Other					2	1.60%			2	0.5%
	94		11		125		197		427	

Fig 304: Dryburgh Mains retouched artefacts by type and raw material

	Chert	Flint	Chal
Narrow blade			
Needles	5		
Triangles	6	2	
Crescents	6	1	
B'Blades	3	4	
unclass narrow	25	17	
	45	24	
Broad Blade			
Isosceles	2	5	
Crescents	1	1	
backed and otp		2	
backed		1	
unclass broad	6	8	
	9	17	
Unclassifable	18	20	1

Figure 305: Dryburgh Mains: microlith types by raw material

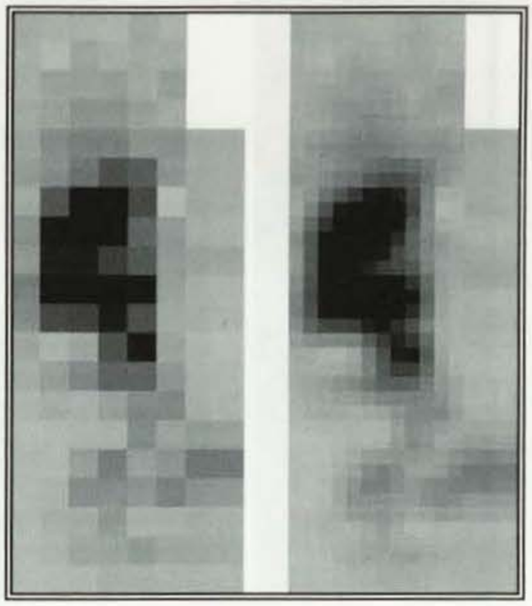


Figure 306: Sands of Forvie: distribution of all artefacts (LHS: raw data, RHS interpolated)

Previous ID	100	101	102	103	104	105	106	107
119	14	7	6	4	17	6	x	x
118	10	0	19	12	15	13	x	x
117	10	24	24	27	13	26	x	x
116	14	21	36	37	22	16	x	x
115	21	39	47	46	36	36	17	16
114	30	38	56	83	73	31	21	16
113	17	81	136	150	88	0	14	14
112	38	116	139	138	65	29	12	9
111	35	115	115	96	76	25	12	23
110	51	132	164	173	120	24	0	10
109	44	89	95	115	84	15	24	10
108	21	7	18	85	116	20	9	3
107	14	29	44	68	67	33	18	7
106	6	15	12	25	42	42	15	12
105	1	1	7	12	45	21	32	29
104	5	2	29	53	29	36	46	56
103	1	5	38	39	35	47	19	36
102	4	10	13	31	9	12	16	13
101	1	5	21	24	30	19	11	17
100	4	4	6	14	15	9	9	12

Figure 307: Sands of Forive: distribution of all artefacts

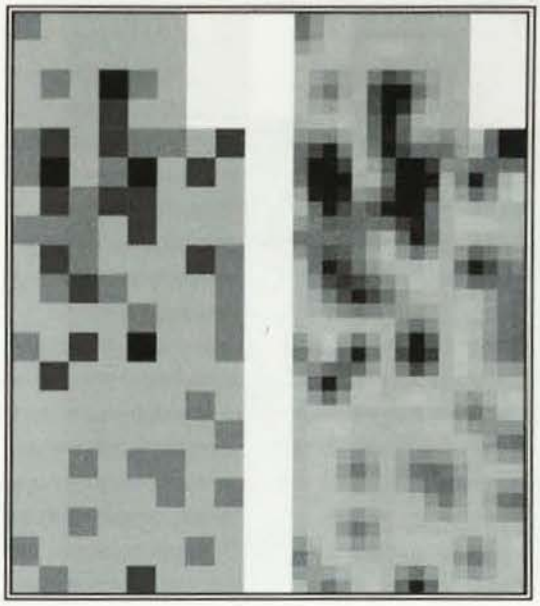


Figure 308: Sands of Forvie; distribution of bashed lumps/split pebbles

Previous ID	100	101	102	103	104	105	106	107
119	1	0	0	0	0	0	X	X
118	0	0	0	0	0	0	X	X
117	0	1	0	3	1	0	X	X
116	0	0	0	2	0	0	X	X
115	1	2	0	2	1	1	0	2
114	1	4	0	1	4	0	2	0
113	0	2	1	2	2	0	0	0
112	1	1	1	0	2	0	0	0
111	0	2	1	0	0	0	2	1
110	0	1	2	1	0	0	0	1
109	0	0	0	0	1	0	0	1
108	1	0	2	0	3	0	0	1
107	0	2	0	0	0	0	0	0
106	0	0	0	0	0	0	1	0
105	0	0	0	0	0	0	0	1
104	0	0	1	0	1	1	0	0
103	0	0	0	0	0	1	0	1
102	0	0	1	0	0	0	0	0
101	1	0	0	0	0	0	1	0
100	0	1	0	0	2	0	0	0

Figure 309: Sands of Forvie: distribution of bashed lumps/split pebbles (data)

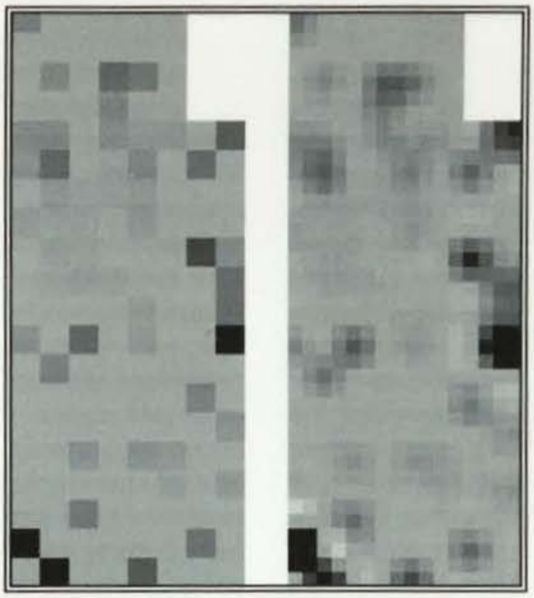


Figure 310: Sands of Forvie: distribution of bashed lumps/split pebbles as % of finds in a square

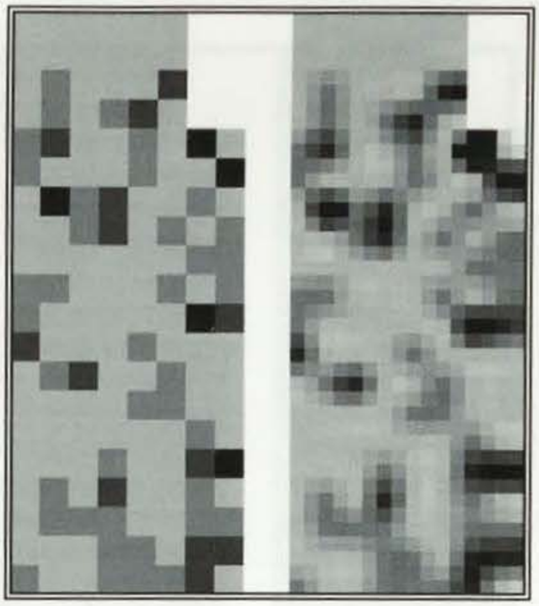


Figure 311: Sands of Forvie: distribution of bipolar cores

Previous ID	100	101	102	103	104	105	106	107
119	0	0	0	0	0	0	X	X
118	0	0	0	0	0	0	X	X
117	0	1	0	0	0	2	X	X
116	0	1	0	1	2	0	X	X
115	1	2	0	0	1	0	4	0
114	1	0	0	0	1	0	0	3
113	0	3	1	2	0	0	1	0
112	0	0	1	2	0	1	0	1
111	0	0	0	0	0	0	1	1
110	1	1	0	0	0	1	0	1
109	1	0	0	0	0	0	3	2
108	2	0	0	0	1	0	0	0
107	0	1	2	0	0	1	0	0
106	0	0	0	0	1	1	0	0
105	0	0	0	0	0	0	1	0
104	0	0	0	1	0	0	2	3
103	0	1	0	2	0	0	1	0
102	0	1	1	1	0	0	1	1
101	0	0	0	1	1	0	2	2
100	1	0	0	1	1	1	2	0

Figure 312: Sands of Forvie: distribution of bipolar cores (data)

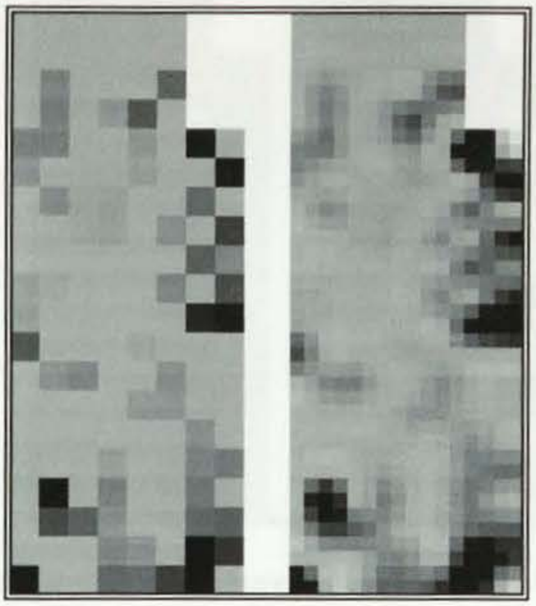


Figure 313: Sands of Forvie: distribution of bipolar cores as % of finds in a square

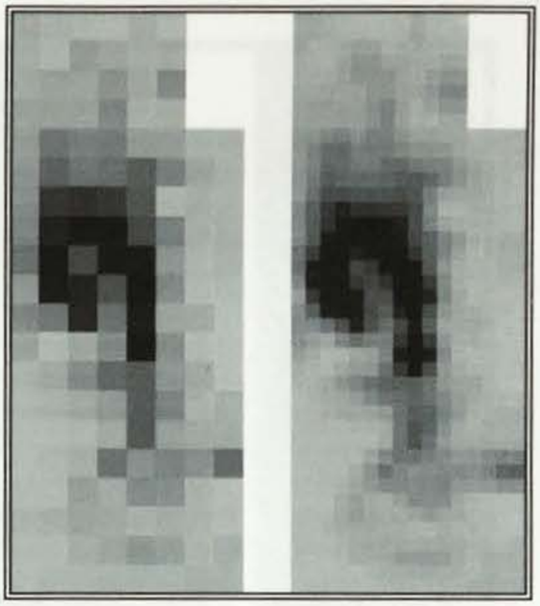


Figure 314: Sands of Forvie: distribution of blades

Previous ID	100	101	102	103	104	105	106	107
119	4	2	1	0	3	0	x	x
118	2	0	6	4	2	3	x	x
117	3	5	4	7	3	9	x	x
116	5	5	5	9	1	3	x	x
115	6	12	10	11	6	6	2	2
114	7	14	12	13	15	10	4	2
113	8	21	22	21	17	0	2	2
112	10	23	26	28	19	10	2	3
111	13	32	19	25	25	7	1	3
110	7	33	23	18	32	9	0	1
109	10	12	23	13	24	5	4	0
108	6	0	4	9	35	8	0	0
107	2	4	9	14	16	7	4	0
106	1	2	4	7	16	10	2	4
105	0	0	1	4	17	6	4	5
104	0	1	3	13	8	10	8	14
103	0	0	6	4	9	8	2	1
102	1	2	5	4	2	3	2	1
101	0	0	3	5	7	6	2	4
100	0	1	1	2	2	2	3	3

Figure 315: Sands of Forvie: distribution of blades (data)

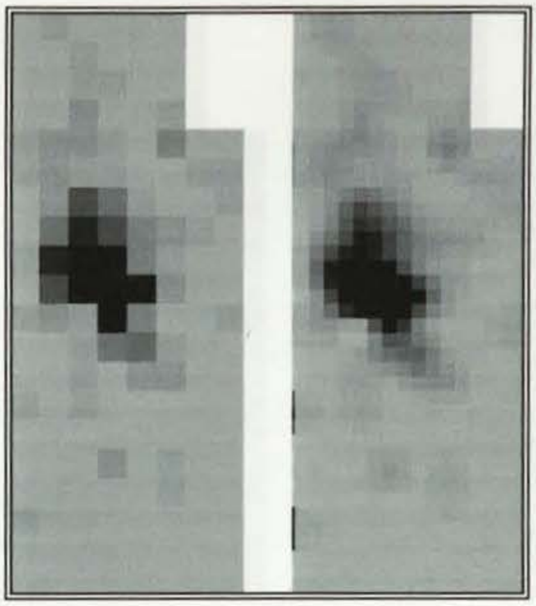


Figure 316: Sands of Forvie: distribution of burnt material

Previous ID	(Eastings)							
	100	101	102	103	104	105	106	107
(northings) 119	0	1	0	0	0	0	0	0
118	0	0	1	0	0	0	0	0
117	0	0	1	1	0	0	0	0
116	0	0	2	0	0	1	0	0
115	1	2	2	1	0	3	0	0
114	1	2	1	1	0	0	1	1
113	0	2	7	4	1	0	0	1
112	0	4	9	7	3	2	1	0
111	1	9	12	10	3	1	0	0
110	0	7	24	32	10	2	0	0
109	1	2	1	11	3	0	0	1
108	0	0	1	4	5	1	0	0
107	0	0	1	0	2	2	0	0
106	1	0	1	0	0	0	0	0
105	0	0	0	0	0	0	0	0
104	0	0	0	2	0	1	0	0
103	0	0	0	0	0	1	0	0
102	1	0	0	0	0	0	0	0
101	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0

Figure 317: Sands of Forvie: distribution of burnt material (Data)

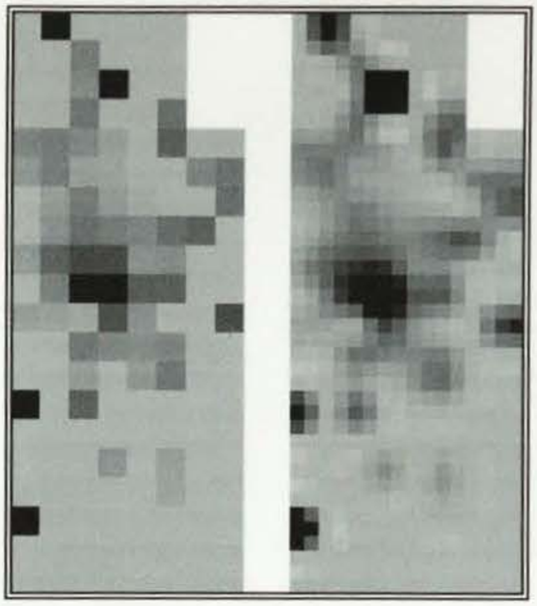


Figure 318: Sands of Forvie: distribution of burnt material as % of finds in a square

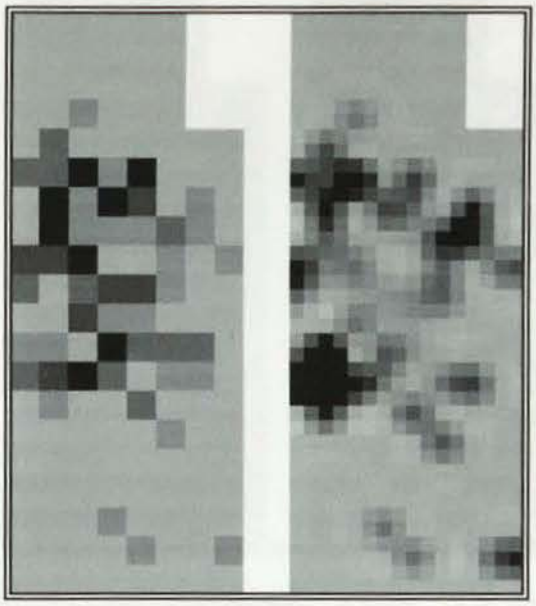


Figure 319: Sands of Forvie: distribution of cores

Previous ID	Eastings							
	100	101	102	103	104	105	106	107
(northings) 19	0	0	0	0	0	0	0	0
118	0	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0	0
116	0	0	1	0	0	0	0	0
115	0	2	0	0	0	0	0	0
114	2	2	6	1	4	0	0	0
113	0	6	1	8	3	0	1	0
112	0	5	1	1	1	2	1	0
111	3	3	4	0	0	1	0	1
110	2	0	2	3	3	1	0	0
109	0	0	3	1	1	0	0	0
108	1	1	0	4	2	2	2	0
107	2	3	4	2	0	1	1	0
106	0	1	0	0	2	0	0	0
105	0	0	0	0	0	1	0	0
104	0	0	0	0	0	0	0	0
103	0	0	0	0	0	0	0	0
102	0	0	0	1	0	0	0	0
101	0	0	0	0	1	0	0	1
100	0	0	0	0	0	0	0	0

Figure 320: Sands of Forvie: distribution of cores (data)

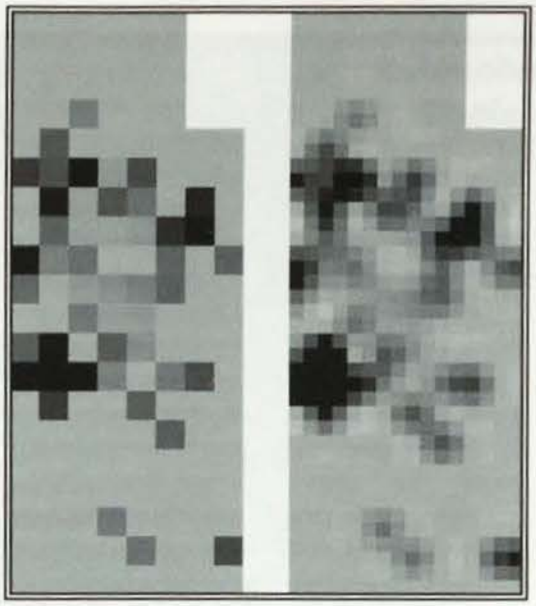


Figure 321: Sands of Forvie: distribution of cores as % of finds in a square

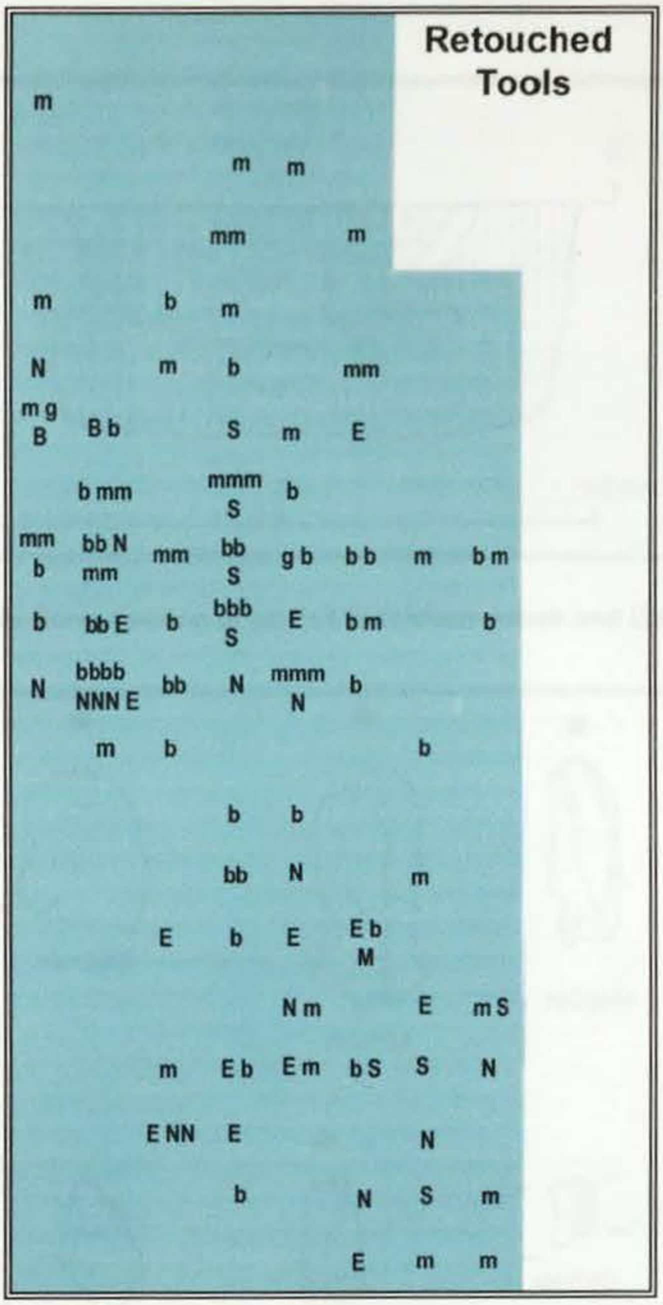


Figure 322: Sands of Forvie: distribution of retouched pieces

B: burin
b: microburin
E: edge retouched
g: graver
m: microlith
N: notch
S: scraper

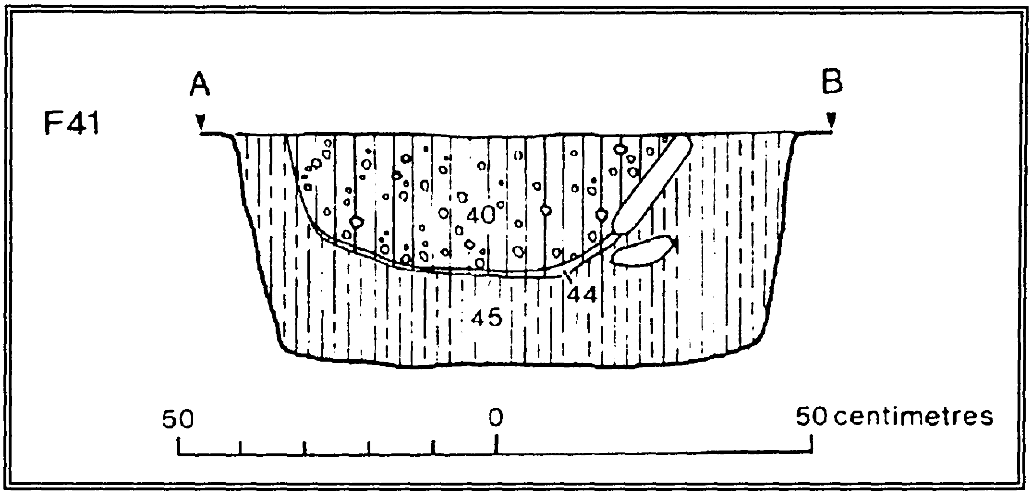


Figure 323: Fife Ness: section of pit F41 (Wickham-Jones and Dalland 1998)

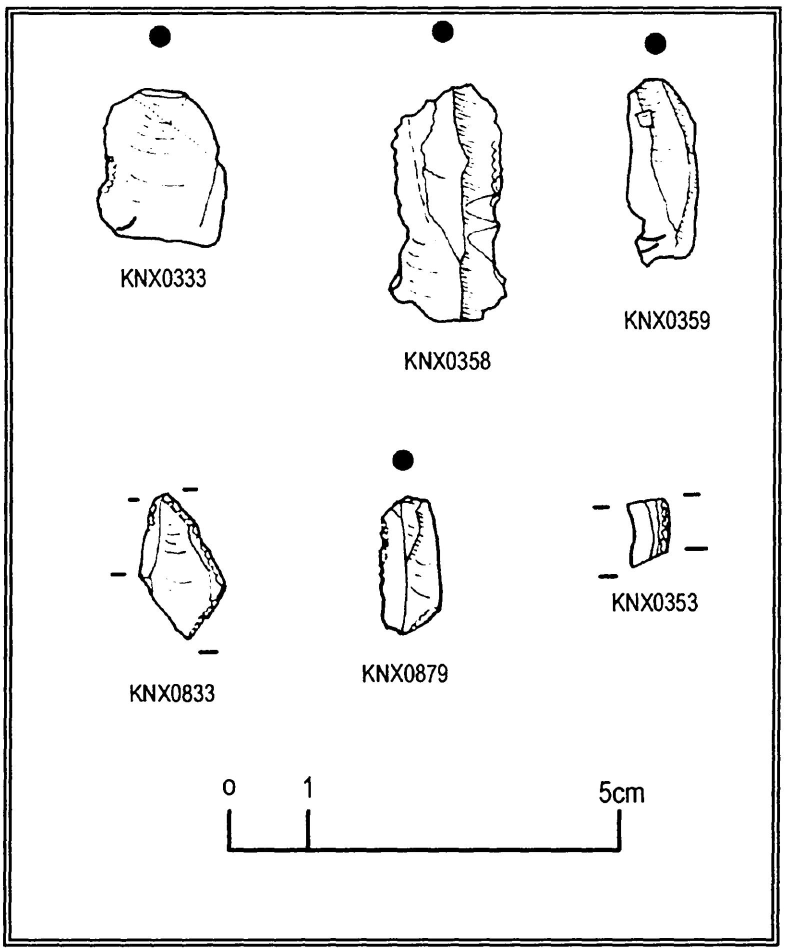


Figure 324: Tweed Valley: Knox finds from varied sites

Top row, L-R: Bellanrig, Neidpath Haugh, Neidpath Haugh
Bottom Row: Kittlegairy Hill, Crookston Burn, Bellanrig

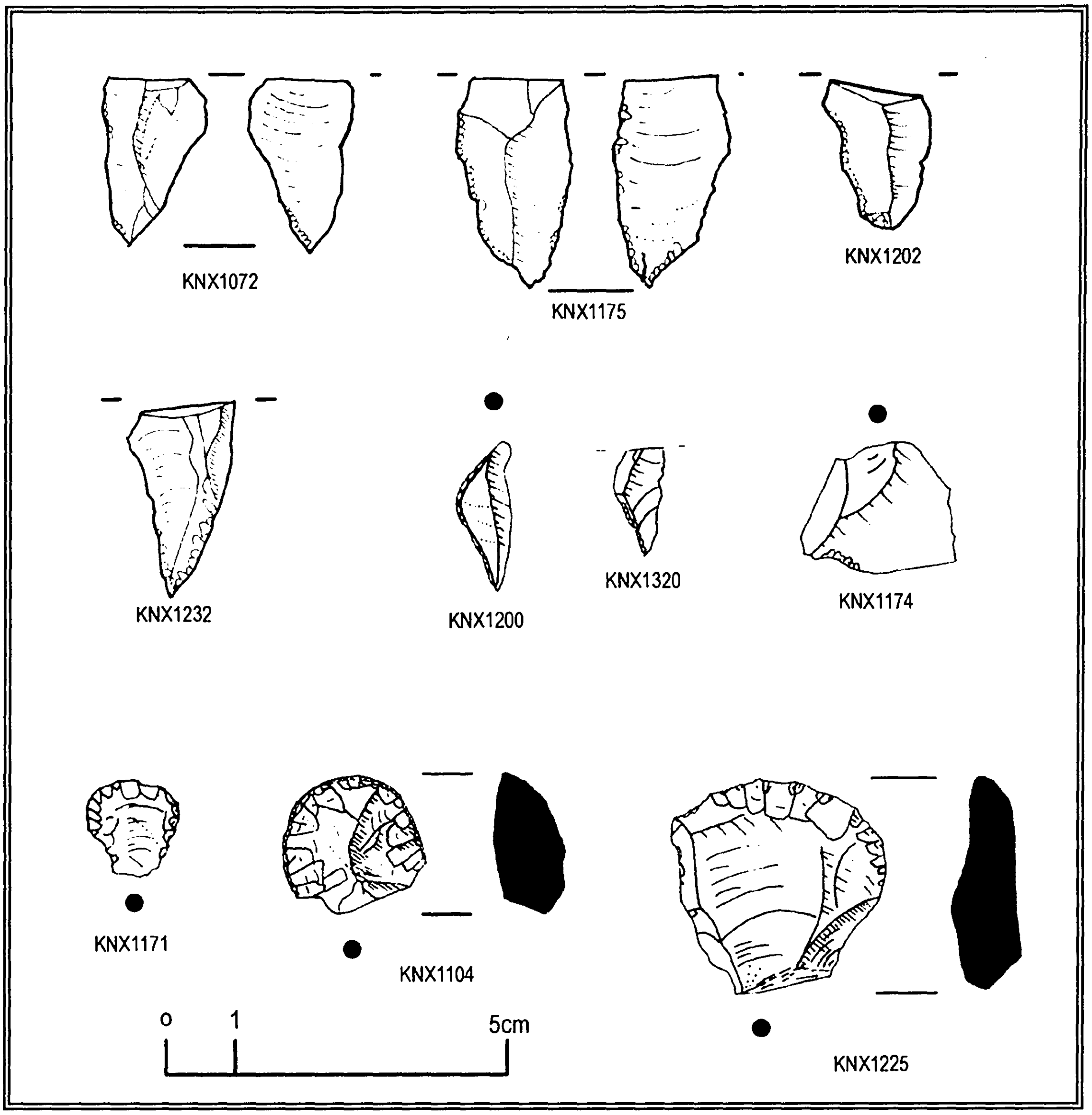


Figure 325: Ingraston Sand Quarry: surface finds, Knox collection

Blank	N		Chert		Flint		Agate	Chalcedony	Pitchstone	Quartz/ Quartzite
Bashed Lump	2	0.9%	2	1.5%						
Bi-Polar core	12	5.3%	6	4.6%	6	6.7%				
Blade	13	5.7%	8	6.1%	4	4.5%			1	
Chunk	25	11.0%	19	14.5%	5	5.6%	1			
Core	4	1.8%	3	2.3%	1	1.1%				
Flake Irregular	91	39.9%	58	44.3%	31	34.8%				2
Flake Regular	79	34.6%	35	26.7%	42	47.2%		1		1
Pebble	2	0.9%					2			
Total	228		131		89		3	1	1	3

Figure 326: Ingraston Sand Quarry: Composition of assemblage

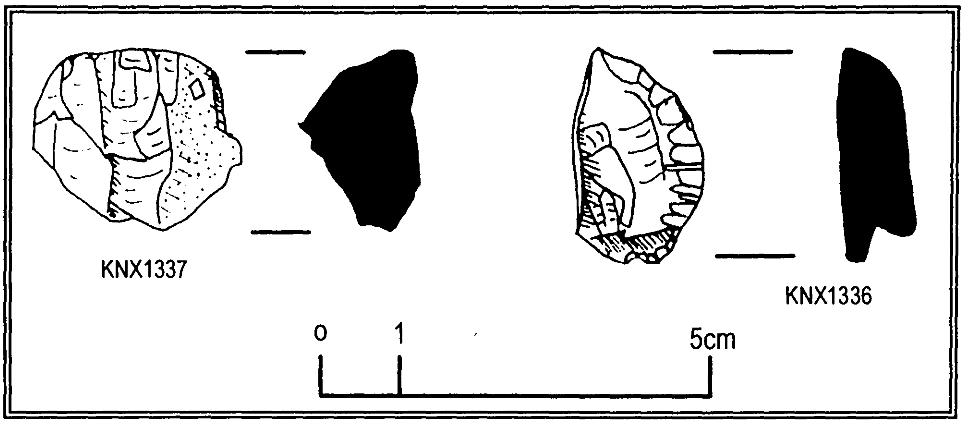


Figure 327: Jedderfield: surface finds, Knox collection

Blank	N	%
Bashed lump	**1**	**4%**
Blade	**1**	**4%**
Chunk	**5**	**20%**
Core	**5**	**20%**
Flake irreg	**8**	**32%**
Flake reg	**5**	**30%**
	25	

Figure 328: Jedderfield: composition of Knox assemblage

blank	N	
Bashed Lump	4	3.0%
Bi-Polar core	1	0.7%
Blade	2	1.5%
Chunk	46	34.3%
Core	6	4.5%
Flake Irreg	68	50.7%
Flake Reg	7	5.2%
Total	134	

Figure 329: Wide Hope Shank: composition of Knox assemblage

Type	Total	%
Pebbles	14	0.6%
Core	96	4.2%
Chunk	554	24.3%
Debitage Flakes	107	4.7%
Regular Flakes	1242	54.5%
Blades	147	6.5%
Retouched	118	5.2%
Total	**2278**	

Figure 330: Springwood Park: composition of assemblage (Wickham-Jones nd. Table 1)

Material	Total	%
Agate	9	0.4%
Chalcedony	1047	45.9%
Chert	785	34.4%
Flint	419	18.4%
Coarse stone	10	0.4%
Pitchstone	2	0.1%
Quartz	7	0.3%
	2279	

Figure 331: Springwood Park: raw materials utilised (after Wickham-Jones nd. Table 2)

Type	Number	Percentage
Incomplete Flakes	6768	75.8
Bashed Lumps	1555	17.4
Complete Flakes	172	1.9
Natural	167	1.9
Retouched pieces	122	1.4
Blade cores	82	0.9
Flake cores	67	0.7

Figure 332: Rink Farm: artefact types (after Haley 1990:Table 3).

	% of flakes	% of tools	% of cores
Chert	70	67	83
Flint	9	21	9
Quartz	6	3	3
Agate	10	6	7
Other	5	3	1

Figure 333: Rink Farm: raw material(after Haley 1990:Table 4).

Type	Number	%
Microliths	**50**	**41**
Scrapers	**32**	**26**
Retouched pieces	**12**	**10**
Perforators	**8**	**7**
Serrated pieces	**7**	**6**
Notched Pieces	**5**	**4**
Splintered Pieces	**4**	**3**
Points	**4**	**3**
Total	**122**	

Figure 334: Rink Farm: artefact types (after Haley 1990:Table 8).

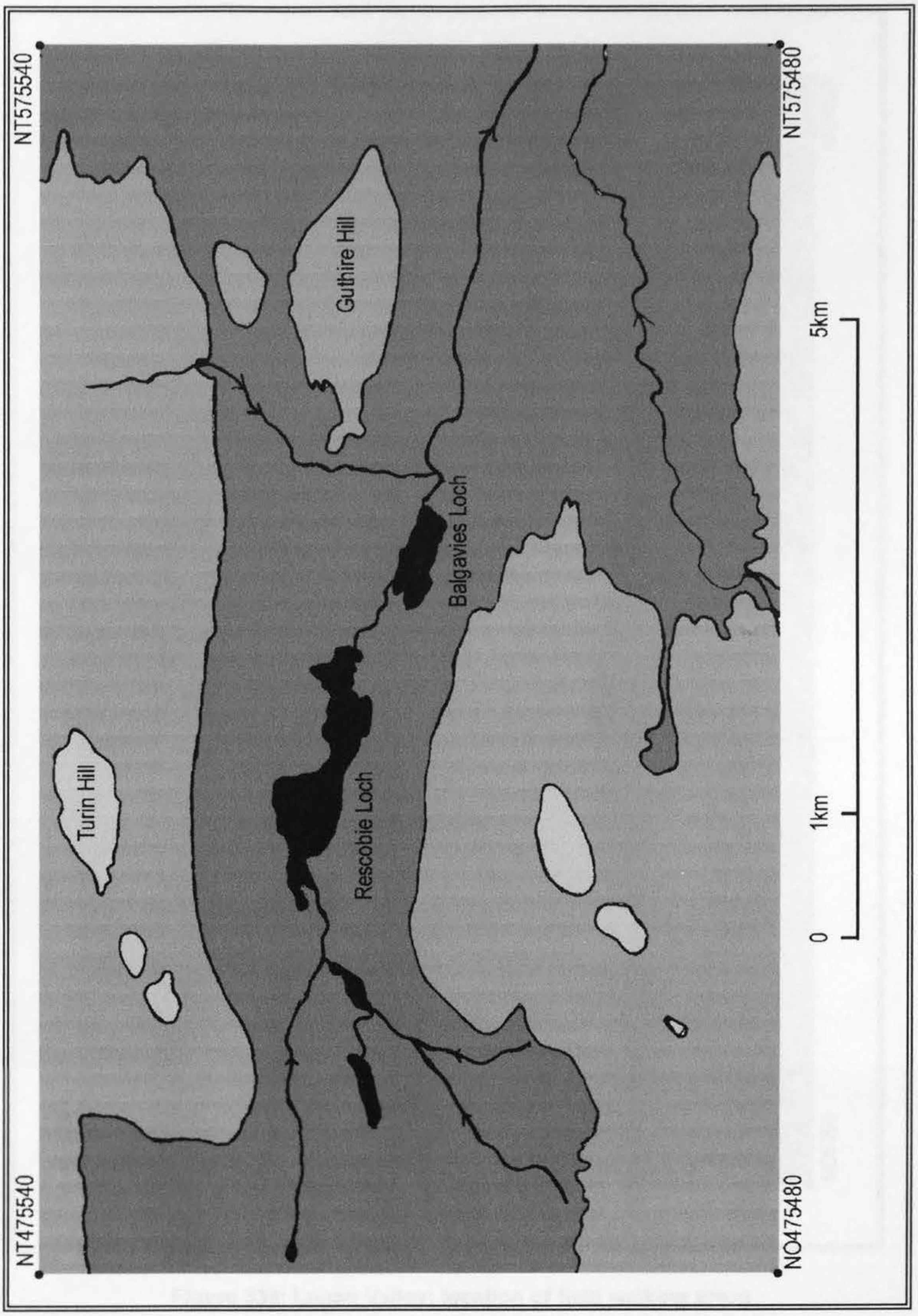


Figure 335: Lunan Valley: regional landscape.

Henry's collections are mainly from north and east of Balgavies Loch. My fieldwork was to the North of Rescobie Loch

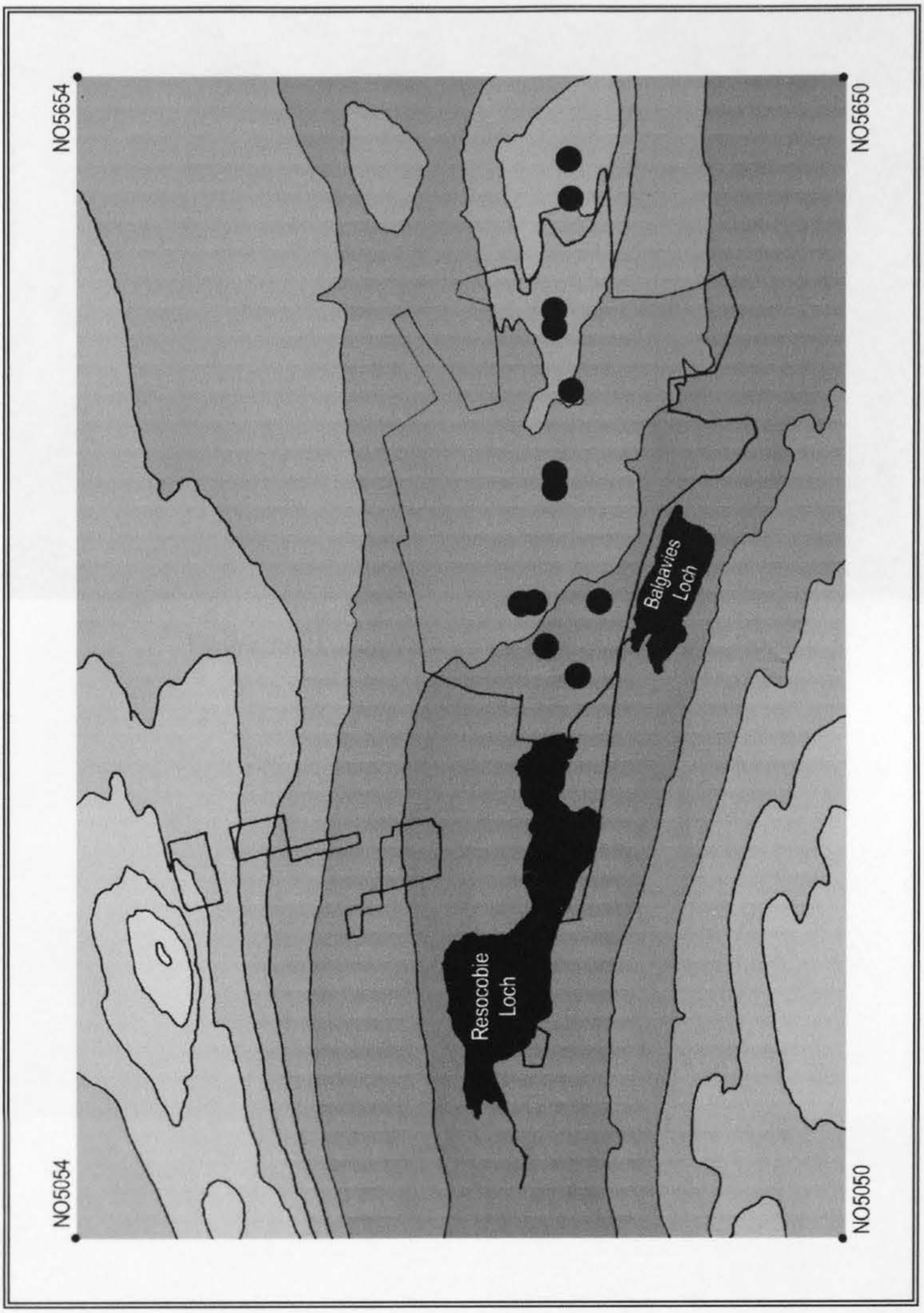


Figure 336: Lunan Valley: location of field walking areas

Henry's main sites circled, but not all findspots marked (compare to Sherriff 1986b). Henry collected from the area outlined to the right. My fieldwalking covered the transect to the left and the testpits focused on the area to the Southeast of Rescobie Loch

Figure 337: Lunan Valley: view N over Balgavies Loch

Location	ngr e	NGRn	N
Unk.	532	514	1
Unk.	537	517	2
Unk.	542	507	1
Bothy	533	516	67
Bothy (n)	534	516	28
Bothy?	534	516	20
Far Long Bank	531	516	268
Gallow Hill	529	514	97
Garden	536	511	2
Guthrie Hill	554	514	28
Guthrie Hill Summit	556	514	157
Long Bank	533	513	35
School	538	515	40
School (N. end)	539	515	148
School?	539	513	3
Sheep Park	537	517	14
Smiddy	547	515	35
Smiddy?	547	516	6
West Guthrie	552	514	13
Windy Knowe	544	514	119
Windy Knowe	548	515	7
Windy Knowes nr Road	548	515	19

Figure 338: Lunan Valley: location of scatters in the Henry collection

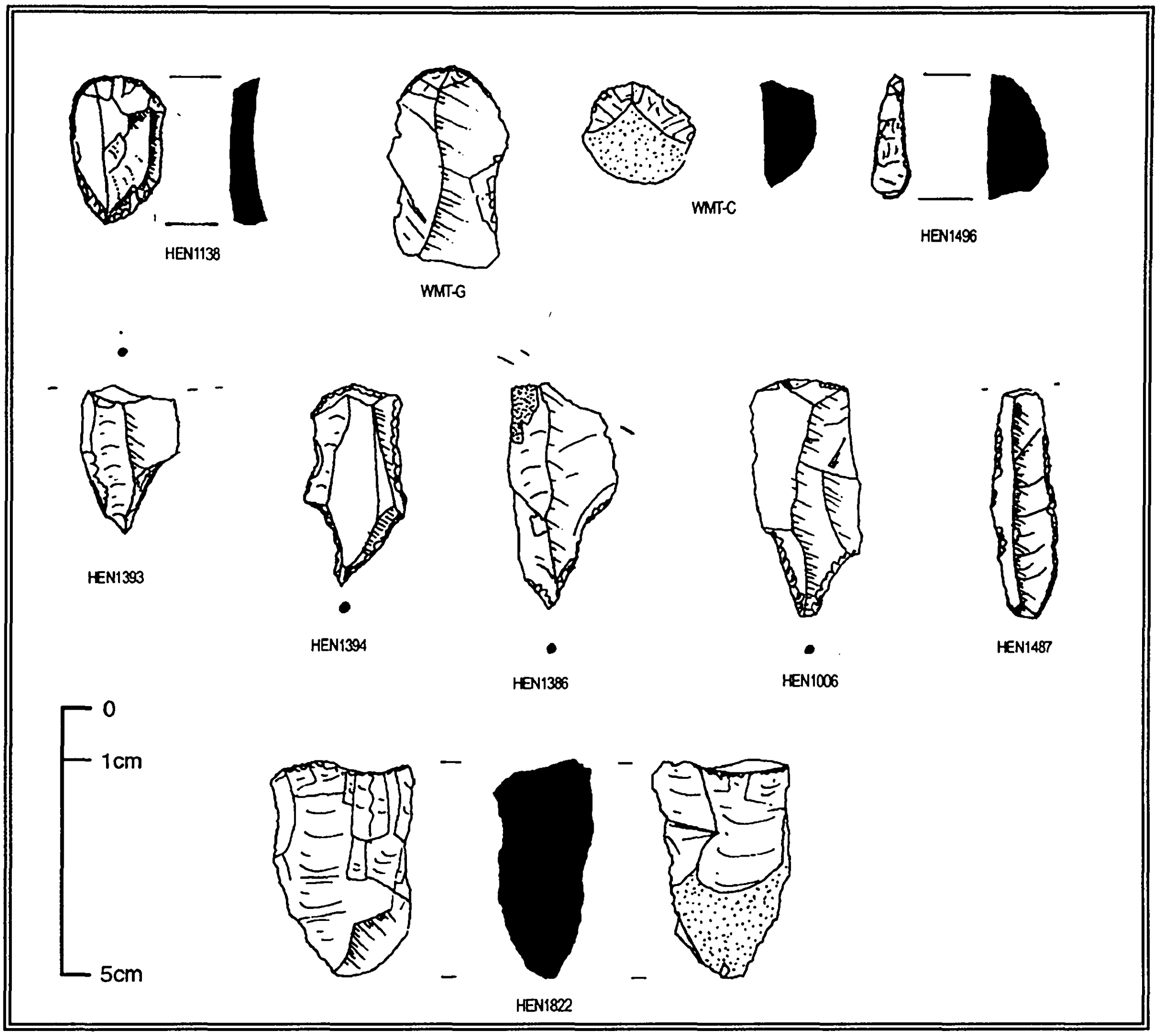


Figure 339: Henry Collections: lithics (1)

Top row: L-R: Smiddy, West Mains of Turin (x2), Bothy
Middle Row: West Guthrie (x3), Gallow Hill, Bothy
Bottom Row: Long Bank

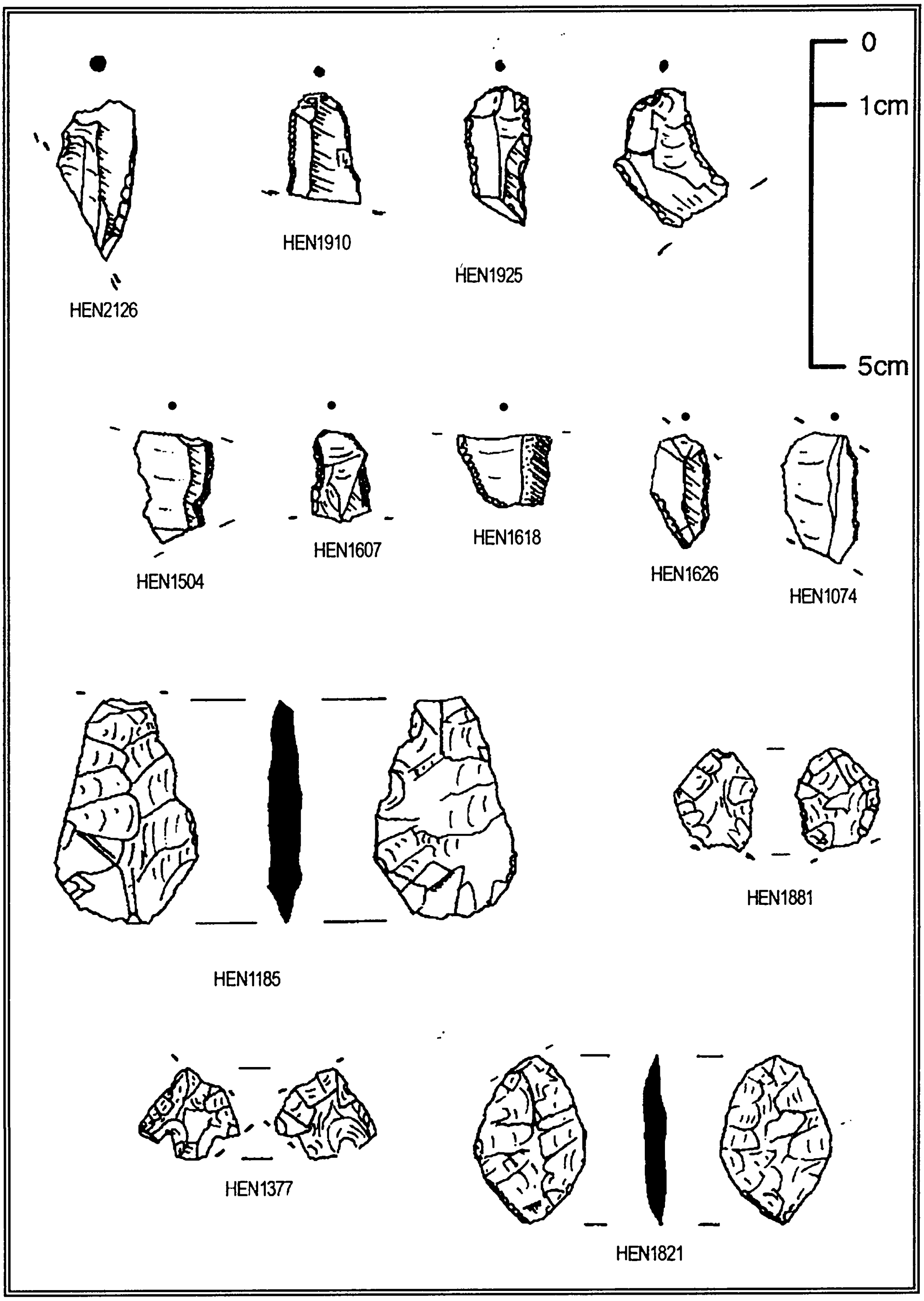


Figure 340: Henry Collections: lithics (2)

Top Row: Windy Knowe, Schol (N) (x2)
Second Row: Far Long Bank (x4), Gallow Hill
Third Row: Guthrie Hill, School N
Bottom Row: Windy Knowe, Long Bank

	agate		flint		other	Total
Bashed lump	1	3.4%	1	0.4%		2
Bipolar			3	1.3%		3
Blade			12	5.1%		12
Chunk	13	44.8%	66	27.8%	1	80
Core			5	2.1%		5
Flake irreg	8	27.6%	76	32.1%		84
Flake reg	6	20.7%	74	31.2%	1	81
Split pebble	1	3.4%				1
Total	29		237		2	268

Figure 341: Far Long Bank: composition of Henry collection

	1ry		2ry		3ry		Total
Blade	0	0.0%	2	16.7%	10	83.3%	12
Chunk	7	10.6%	25	37.9%	34	51.5%	66
Flake irreg	11	14.5%	28	36.8%	37	48.7%	76
Flake reg	7	9.5%	21	28.4%	46	62.2%	74
	26	11.4%	78	34.2%	130	57.0%	228

Figure 342: Far Long Bank: reduction evidence

	Flint		Agate	Total	
bashed lump	1	1.0%		1	1.0%
bipolar	2	2.1%		2	2.1%
blade	7	7.3%		7	7.2%
chunk	22	22.9%	1	23	23.7%
core	5	5.2%		5	5.2%
flake irreg	16	16.7%		16	16.5%
flake reg	43	44.8%		43	44.3%
	96			97	

Figure 343: Gallow Hill: composition of assemblage

	Retouched	Indet
Blade	3	
Chunk		1
Flake Irreg	1	1
Flake Reg	9	5

Figure 344: Gallow Hill: retouched blanks

	Flint		Agate	Total	
Bipolar	1	1.1%		1	1.1%
Blade	9	10.1%		9	9.8%
Chunk	28	31.5%	2	30	32.6%
Core	1	1.1%		1	1.1%
Flake irreg	24	27.0%		24	26.1%
Flake reg	26	29.2%	1	27	29.3%
	89		3	92	

Figure 345: Guthrie Hill: composition of the assemblage

	flint	%	agate	other	Total	
Bashed lump	1	0.7%			1	0.7%
Bipolar	3	2.2%			3	2.0%
Blade	7	5.2%			7	4.7%
Chunk	46	34.1%	8	1	55	37.2%
Core	1	0.7%			1	0.7%
Flake Irreg	47	34.8%	2		49	33.1%
Flake Reg	30	22.2%	1		31	20.9%
Split pebble			1		1	0.7%
Total	135		12	1	148	

Figure 346: School N: composition of the assemblage

	1ry	2ry	3ry	Total
Blade		1	6	7
Chunk	6	13	30	49
Flake Irreg	4	20	25	49
Flake Reg	1	7	23	31
Total	11	41	84	136
	8.1%	30.1%	61.8%	

Figure 347: School N: reduction evidence

	flint	%
Bashed lump		
Bipolar	1	2.5%
Blade	4	10.0%
Chunk	13	32.5%
Core	3	7.5%
Flake Irreg	6	15.0%
Flake Reg	12	30.0%
Split pebble	1	
	40	

Figure 348: School: composition of the assemblage

	flint		agate	N	
Bipolar	1	0.9%		1	0.8%
Blade	12	10.7%		12	10.1%
Chunk	33	29.5%	4	37	31.1%
Core	3	2.7%		3	2.5%
Flake irreg	28	25.0%	1	29	24.4%
Flake reg	35	31.3%		35	29.4%
Split pebble			2	2	1.7%
	112		7	119	

Figure 349: Windy Knowe: composition of the assemblage

	Flint	%
Blade	2	7.7%
Chunk	4	15.4%
Core	2	7.7%
Flake irreg	5	19.2%
Flake reg	13	50.0%
	26	

Figure 350: Windy Knowe Rd.: composition of the assemblage

	Flint	%
Blade	1	2.9%
Chunk	10	28.6%
Core	1	2.9%
Flake irreg	8	22.9%
Flake reg	15	42.9%
	35	

Figure 351: Smiddy: composition of the assemblage

	Flint	%
Bipolar	3	4.5%
Blade	4	6.0%
Chunk	20	29.9%
Flake irreg	20	29.9%
Flake reg	20	29.9%
	67	

Figure 352: Bothy: composition of the assemblage